

# Towards Successful Research Data Management

A Case Study at Aalto University  
and Centre for Science (CSC)



**Rahel Triwidati Manurung**  
MA Collaborative and Industrial Design

Aalto University  
School of Arts, Design and  
Architecture  
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**Author** Rahel Triwidati Manurung

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### Abstract

Until today, many services available for research data management were not supported by adequate information about how they work together throughout the research lifecycle and how they will be beneficial for Aalto researcher. The objective of this study is to provide the researchers with a seamless path and process that best supports the research at Aalto University. The target group is researchers for a few particular factors. First, since they play a significant strategic role in contributing to the scientific community and encouraging research. Second, they are the data creator from first-hand individuals who also manage the research data in line with FAIR data principles; in order to make data findable, accessible, interoperable, and reusable.

The case study has been undertaken in Finland within Aalto research group. This thesis is a collaborative project between Aalto University Information Technology Services (Aalto IT Services) and Center for Science (CSC), a Finnish center of expertise in information technology in facilitating the Research Data Management (RDM) for the researchers. This project has allowed the author to work with IT-related people who have given particular challenges during the research and built a solution with the consideration of the end-users point of view, the service provider and institution goals. The study covered interviews with Aalto researchers from various departments, a data management agent, and CSC. The method of service design is used to understand the needs and behavior of consumers and connect stakeholders to the target users that are useful for developing ideas in the development of future service. Several interaction problems were found after mapping the customer journey with all the challenges and expectations.

The result of the user interviews was created user typologies that were useful in identifying patterns in customers and in leveraging their roles in RDM development. The main findings of this study proposed the broader and the more comprehensive information on the services available to all Aalto departments, integration between Aalto services and external services, and greater accessibility to share and collaborate with researchers from various universities or countries. The study concluded by analyzing the improvement of ideas through internal validity. It is suggested that IT supporters need to know more about the culture of customers on how to record everything, particularly since they have different types of data and resources used during their research. Communication plays an important role in further developing the research data management services at Aalto University.

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**Keywords** service design, research data management, information technology, cross-disciplinary, customer experience

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# Acknowledgement

*This thesis has been my personal reflection on the journey of being a designer. As a person who always wants to upgrade herself, I found that the design service is growing and growing, and it is indeed an important phase at the beginning of the design process. Had a background in the industrial design, I realize that people are not just selling the product, but also the service. During my master's study, my curiosity about service design is increasing, and I had a desire to accomplish my education with the thesis topic related to this field. I found the collaboration project of Aalto IT Services and the Center of Science (CSC) was perfectly match my interest. Going through this process at the time of writing this thesis really helped me to dig deeper into the topic, and understand why it is so important in the first place, manage the research data. First and foremost, I would like to show my greatest gratitude to Aalto University. I am honored to have been selected as a student and the recipient of the Aalto University Scholarship for the 2017 period. Thank you for the generous support to build my future.*

*I want to show my gratitude to Aalto IT Services and CSC for the great opportunity they have given to me. I would explicitly like to thank and without whom this process would not have been possible, my supervisor Andres Lucero and my advisor Ilari Lähteenmäki and Juha Juvonen for their profound and caring guidance through this process. Also, for Heta Koski and Heidi Laine for taking their time to share the research data management experience and fruitful insight in CSC. Every thesis writer would deserve such supportive supervising to be able to reach their best.*

*I would also like to thank all the people from Aalto University who participated in this project, listening and guiding me on the way and, most importantly, making time to do so. My sincere thanks go to my family and husband. The work would have remained incomplete without them, and many wisdoms would have remained indivisible. Thank you for Etika Vidyarini at Kyushu University, for being my guide, proofreading, and patiently answering my questions during the writing of my thesis. And finally, many thanks to my Indonesian friends and all the new friends I made in Finland. Thank you for cheering me up and encouraging me to pursue my thesis. I believe there is nothing in our encounter that is a coincidence.*

Helsinki, 28th October 2019

Rahel Triwidati Manurung

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# 1. INTRODUCTION

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Imagine a worst-case situation. What if someone stole your laptop, your department came up in flames, your data is corrupt, or your information would have been infected with a virus or some other catastrophe? Would it be possible to retrieve your information? These are all issues to ensure that researchers do not face a loss of data.

Data soon will be a big issue in the future where everything is digitalized. Data preservation, as well as the research data management, play an essential role for an educational institution especially on how to manage the use of the limited repository. This project is a collaboration between Aalto University and the Center for Science (CSC), the target is to build a seamless path and process that best support the research. This project aims to understand how the current research data management services support the process in real cases — getting the researchers' perspective on available research data management services. Enable to focus the development efforts to actions that bring the most value to researchers. Identifying opportunities and needs to streamline the process.

Data digitalization is inevitable. Research data will be growing at an incredible rate. The researchers documented their projects as numbers, tables, pictures, and letters and the amount of data generated every day along with their process. With its collection and use, the number of information increases, increasing the possibility of specific innovation and improving existing products and services or inventing new ones. Not all data is valuable, but it is an increasingly critical resource because of its general properties. Digital data, however, is an asset because it can be used, reused, copied, transferred, and stored easily, at breakneck speeds, and internationally, without loss.

## **Service Design**

Design has many different definitions, but at its heart it is about the process of translating ideas into reality, making abstract thoughts tangible and concrete (Design Council, 2018). The recognized advantage of incorporating design to enhance the business efficiency leads many businesses to search for the knowledge of professionals, who can offer external prospects, said Gemser & Leenders in Yu & Sangiorgi (2018).

Service design is all about making the services usable, easy, and desirable. Services are all around us - public transportation, grocery stores, libraries, and school help us to



reach our needs or keep in contact with each other. A service is created up of touchpoints over time - the individuals, data, products, and spaces we meet. For instance, a book, training or IT employee are all touchpoints that make up a university service. In this case, service design is the process of creating these touchpoints and defining how they interact with each other and with the researchers. Using design tools and techniques can provide an in-depth knowledge of user behaviors, their likes and needs, allowing for the development of fresh alternatives. Hopefully, the service design approach can be used to redesign a current service to make it function better for customers or to develop a completely new service as service design is more focused to service systems and organizations, as a human-centered and designed strategy to service innovation (Polaine, Lovlie, & Reason, 2013; Yu & Sangiorgi, 2014).

Design is no longer restricted to the implementation of fresh physical products, but also new types of procedures, services, interactions, types of entertainment and methods of communication and collaboration (Brown, 2011). These are exactly the kinds of human-centered tasks that designers work on every day. Insight is one of the most critical sources of design thinking, and it usually does not come from large quantitative data that measures what we already have and tell us what we already understand. Going out into the globe and watching people's real experiences as they go about their daily lives is a better starting point. It is rarely going to be able to tell what to do to the everyday people as the customers. The only way to get to know them is by looking for them, watching people do (and not doing) and listening (and not saying) to what they say. This requires some practice. Later the author used design thinking as well to translate findings into ideas and insights into goods and services that enhance life (Brown, 2011).

### **Cross-Disciplinary Design Research**

According to Muratovski, designers with research skills will be able to analyze new problems, be critical of existing solutions, and think in a unique way to increase the long-term design skill and contribute to business and society. "Society today demands a new generation of designers who can design not only products and communications but systems for living as well" (Muratovski, 2016). Becoming strategic planners and professional 'thinkers' and being able to work in a co-creation environment with different types of disciplines is happening in this modern world. Cross-disciplinary research is beneficially helping designers to have a better understanding of various phenomena,

people, cultures, and belief systems (Muratovski, 2016). In line with this, the ways of working that are associated with the author's research are multidisciplinary design practices.

Multidisciplinary Design ways of working call for a collaboration between two or more different disciplines to work together in the same project (Muratovski, 2016). In this case, the author, as a designer, working with a team of IT practitioners on the development of platform services and management levels was involved in the decision-maker of project development. The author gained the knowledge from their viewpoint of their expertise, the integration of knowledge from them is particularly important during the research process, and the result is a co-designed outcome.

However, there is a challenge in cross-disciplinary research among benefits in practical. The collaboration with other researchers is encountered by the designers due to lack of knowledge of other disciplines, different standards, different methodological approach, or only due to negative attitudes and prejudices (as cited in Muratovski, 2016). This had happened when authors held an in-depth interview with the end-users, which is the researchers from various disciplines such as computational, electrical engineering, biomedical, and so on. The challenge faced by the author was to understand their experience during the research that has specific phrases and vocabulary that is not familiar. Also, the platform in this case study needs a proper IT background to understand and operate the service interface.

The ability to understand a problem is substantial to the success of the design outcome. The design problem, which is also a research problem, will next be followed by a research process as it is a design process (Muratovski, 2016). In line with this statement, the author who is practicing service designer and user experience research method has equipped herself to address the problems and know what the limitations in this project are. The author also understands that design is not just about making things simple. The fact is there is a complementary relationship between simplicity and complexity that influences design choices to produce surprising and informative data diagrams, called Simplicity (Klanten, 2011).

Since this thesis project is a collaborative project between Aalto and CSC, there is undoubtedly going to be a collaboration between customer and designer or audience and designer, and these can take many forms and be present to various degrees. Collaboration is dynamic, often messy, uncomfortable, chaotic, confrontational.

However, it enriches the creative process in the best possible way and promotes synergistic working patterns and a product that is enhanced by the contribution of each participant (Anderson, as cited in Jacobson 2000).

## **Research Data Management**

Over the centuries, a range of techniques have been included in computer storage, including punch cards, floppy disks, tape, hard drives, and flash technology. The goal is the same in every instance: to keep data accessible for today and for the future. Research data is a precious resource that often takes a lot of time and money to generate. Therefore, it is worth taking some time to guarantee that information is correctly managed. Funding agencies progressively need data management plans before financing study projects (Aalto RDM, 2017).

This study focuses on the development of research data management services with the main target is the researchers from every school in Aalto University. Research Data Management (RDM) is a term that describes how data collected and used in a research project are organized, stored, preserved, and shared. It includes managing research data on a day-to-day basis during a study project's lifetime (for instance, using coherent file naming conventions). It also contains choices on how data will be preserved and communicated after completion of the project, for example, long-term archiving and access depositing information in a repository. The benefits of data are realized once data is available and accessible. For instance, opening up access to scientific data, primarily once publicly funded research, can boost collaboration, dissemination, reproduction and application of the results of scientific endeavor (OECD, 2019).

Managing data is an integral part of the research process. It can be particularly challenging and how information is handled depends on the data types involved, how data is collected and processed, and how it is used throughout the lifecycle of the study. The result of this study is ideas of improvement that will be developed together with Aalto and CSC.

## 1.1. THESIS STRUCTURE

To answer the research questions the thesis project is discussed in five chapters:

- First, in Chapter 2, background research of the company case study is explained based on the brief that the Author received. To describe the company, its history, and its service system, both desk, and field research are used. This chapter also shows how Research Data Management (RDM) services ' current situation is being handled in Aalto.
- Chapter 3, the methodological approach chapter, explains which tools and methods will be used during the case study. This chapter show the process and service design tools, additionally with a tool based on author's preliminary research.
- Chapter 4, presents the field research of the case study with the company. The chapter then continues to use several common methods of service design, previously described in Chapter 3. The author illustrate and visualize the findings of the research. A short summary answer at the end of the chapter and discusses the questions of the case study research.
- Chapter 5 evaluates and discusses the method and toolkit for the case study and service design result. This process explores the integration of Experience-Based Practice in assessing interactions in tools for service design. The findings and insights are revealed and also mapped to a model based on experience practice. The thesis is finalized by answering the main question and making suggestions for further research.

## 1.2. RESEARCH QUESTION

### MAIN RESEARCH QUESTION

To reach the previously discussed goals, the main research question is as follows:

*“How can service design be integrated in the development of Research Data Management (RDM) services as a whole to provide the researcher with a seamless path and process that best supports the research.”*

### SUB-RESEARCH QUESTION

There are three sub-research questions during this research:

- How to use service design approach to focus on the researchers' point of view
- How to document the users' insights and identifying the challenges and opportunities during their research
- Find the link between the service provider and the customer through touch-points and give ideas of improvements

## 1.3. POSITION OF RESEARCHER

*“Design is what connects creativity with innovation. It forms thoughts for consumers or clients to become practical and appealing proposals. Design can be defined as deployed creativity for a particular purpose.” -The Cox Review*

Having a background in Collaborative and Industrial Design and International Design Business Management, the author is interested in the processes related to service design as the result of co-creation between users, stakeholders, and designers, especially in academia. Research Data Management has been handled seriously in Finland. Therefore, the author would like to learn more about the process and how the research data is managed and reused in the country where the higher education system is among the best in the world.



The author decided to research Aalto's Research Data Management (RDM) services because I want to help the service development in my school, Aalto University, by applying service design approach I have learned. This might become a challenge for me as a design researcher because I am not a native speaker who really understands the value and how the process is going on here, and during the research process, I have positioned myself in the point of view of the users and front-end employees. At the same time, being an active student in Aalto also becomes an advantage because I can have easy access to meet people behind Aalto service where they are welcome and active in giving the opinion as they understand that this project will benefit both researchers and institution. During the later stages of the research, I evaluate my findings with back-end employees.

The author believes that to understand the needs and desires of the people who will use a product or service by directly talking with them. The author also create empathy for consumers by concentrating on human stories and perspectives and ensuring that ideas are essential to the development. The author had regular meetings with stakeholders during the projects, enabled interaction in the conveyance and exchange of ideas, which in turn encourages collaboration between the author, collaborators, and users.

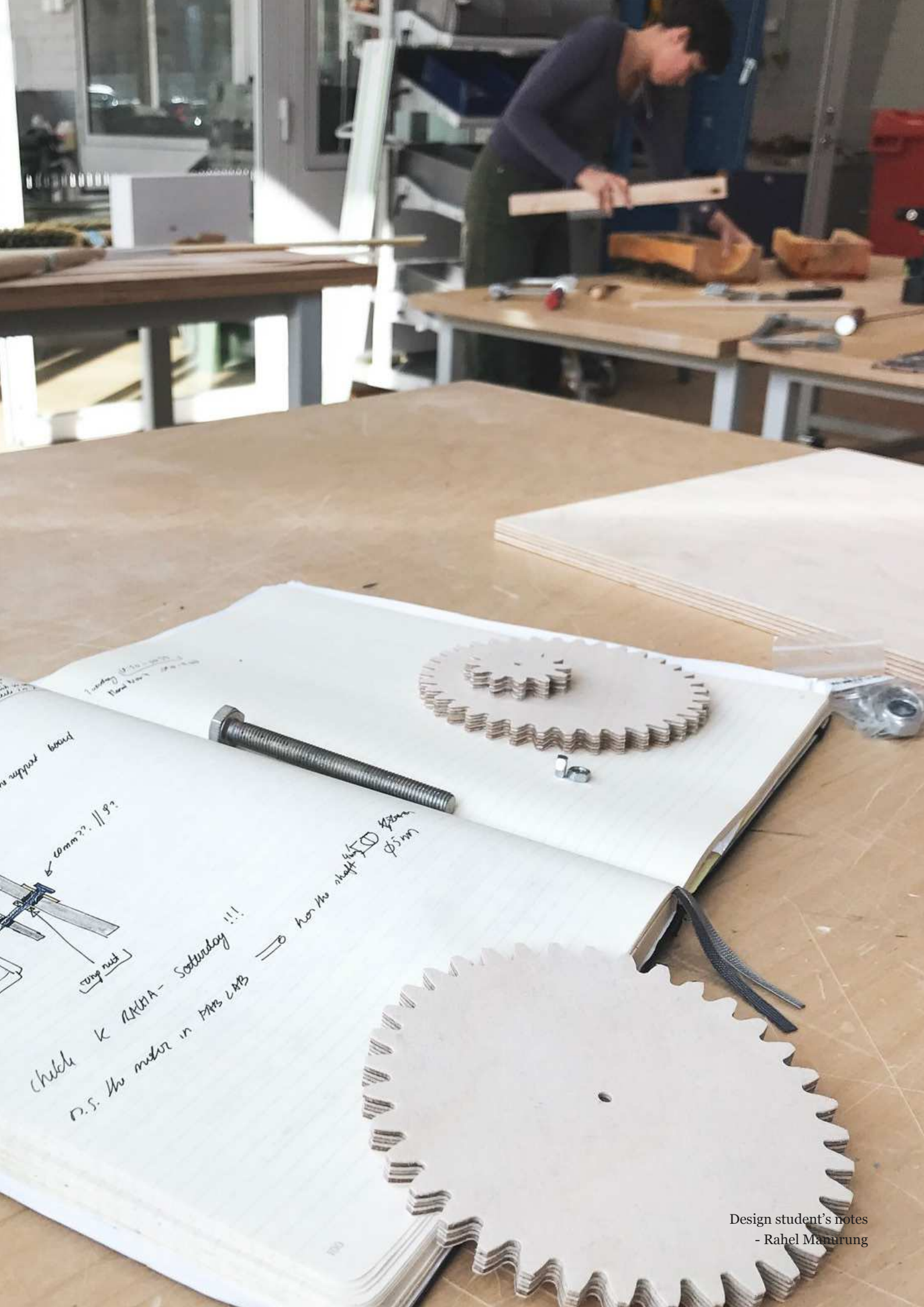
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## 2. BACKGROUND RESEARCH

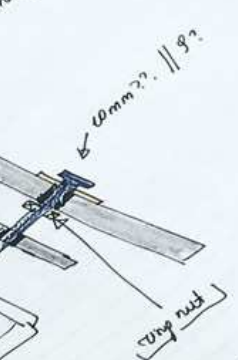
In this chapter, the company case study is explained based on the brief that the Author received. To describe the company, its history, and its service system, both desk, and field research are used. This section also shows how Research Data Management (RDM) services' current situation is being handled in Aalto.

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# BACKGROUND RESEARCH

This thesis does not aim to be an academic design research-oriented work but rather than a practice-oriented and human-centred design project. The aim is to provide a seamless process and applicable input for creating the best researchers experiences for Research Data Management (RDM) in Aalto University.

The idea for the topic of this research arises from discussions between Aalto ITS and CSC. The author was offered a compelling case to understand how the current research data management service supports the research process in the real case. The findings from this study will then enable to focus on the development effort to actions that bring the most value to researchers. This study also aims to identify opportunities, and researchers need to streamline the process, in other words, build a seamless path and process that best supports the research. The process of developing research data services involves building infrastructure to support research operations, building bridges or links between stakeholders and providing the correct tools for the job.

By the proposal of the case company and based on scholarly author interest as well, the author will focus on getting the researcher's perspective on available research data management services using a service design approach. The idea is to provide an in-depth understanding of the current state of research data management and ways to improve it while simultaneously considering the general research experience construction within the process. Hence, this study could answer the limitation of service providers in facilitating the research data and to manage the budget wisely during keeping the research data.

## 2.1. AALTO UNIVERSITY

A committee from Aalto University (later referred to as Aalto) is behind the case building in this research. As a trainee at Aalto University IT Services and a present Aalto student, the decision to conduct this research in Aalto's organizational context provided an exciting yet challenging chance. The author has come to know that Aalto is an excellent academic institution with multiple tasks and multifaceted buildings, all of

which have a significant role in the more prominent organization. The author will provide an overview of the case structure to better understand the case's design as well as the role of this study's target staff group, namely researchers.

Founded in 2010 as a consequence of a merger of three distinct universities, Aalto University combines art, business, and technology in six distinct colleges. Aalto has become one of Finland's, the Nordics', and even Europe's largest and most multidisciplinary universities. There were 910 Bachelor's theses, 1574 Master's theses, and 248 Ph.D. theses in 2018 (Aalto University, 2018). Through these figures, it is right to argue that an organization as large as Aalto requires competent employees to support study data management in various fields of knowledge and appropriate IT sources.

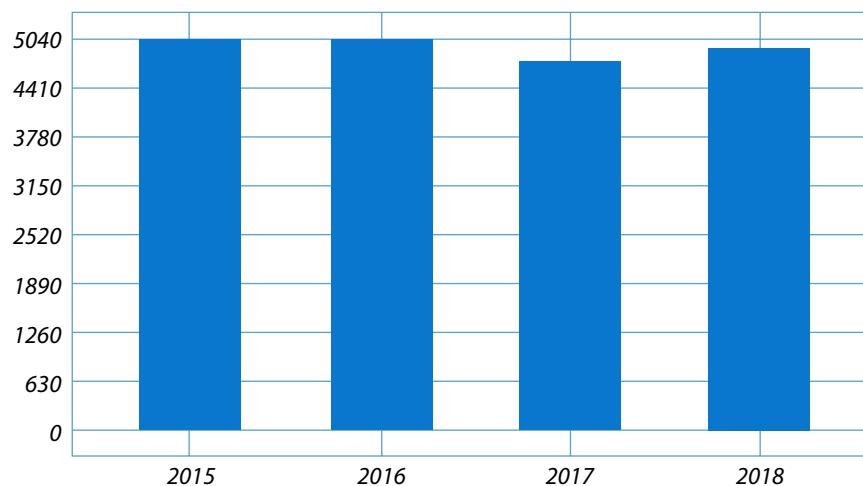


Figure 01. Aalto Research Output Chart (Aalto University, 2019)

For a few particular factors, researchers are selected as the target group of this research. First, since they play a significant strategic role in contributing to the scientific community and encouraging research, Aalto specifically allocated this study to concentrate on scientists. Second, they are the data creator from first-hand individuals who also manages the research data in line with Aalto's vision of FAIR data. Next, the author will discuss more about Research Data Management principles.

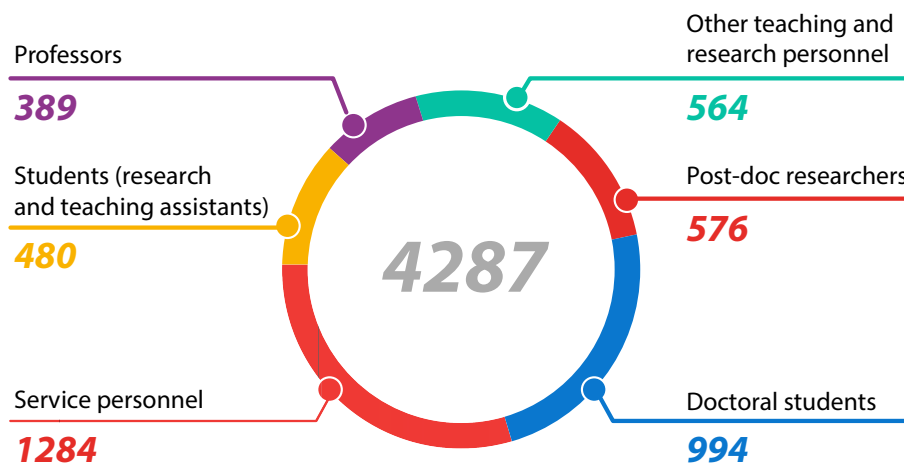


Figure 02. Aalto Personnel Structure (Aalto University, 2018)

Research data management is important in Aalto as it is also mentioned in Aalto University target 2019 as follows.

Research excellence for academic and societal impact	Renewing society by art, creativity and design	Educating game changers	Excellence in advancing and supporting our core goals	Transforming our campus into a unique collaboration hub
<ul style="list-style-type: none"> <li>Research excellence and multidisciplinary collaboration</li> <li>Research environment</li> <li>Research networks</li> </ul>	<ul style="list-style-type: none"> <li>Excellence in artistic activities</li> <li>Visibility, impact and value of creative practices</li> <li>Broader art-based offering</li> <li>Mechanisms to integrate creative practices and design thinking</li> </ul>	<ul style="list-style-type: none"> <li>Attractive programmes</li> <li>E-learning solutions</li> <li>Success of students</li> <li>Working life competences</li> </ul>	<ul style="list-style-type: none"> <li>Attracting and retaining talent</li> <li>Forward-looking leadership and professional practices</li> <li>First-class support services through co-design, digitalization and partnering</li> <li>Proactive communication and digital presence</li> <li>Diversifying and securing funding base</li> </ul>	<ul style="list-style-type: none"> <li>Multidisciplinary clusters and open innovation</li> <li>New ways of working, shared spaces, co-creation and well-being</li> <li>Attractive spaces, productive user experiences</li> <li>Experimental spaces, sustainable development</li> </ul>

Join Strategic Initiatives: Multidisciplinary Activities | Innovation Ecosystem & Entrepreneurship | Digitalization and Campus

Figure 03. The Strategic Development Actions of Aalto University During The Strategy Period 2016-2020 (Aalto University, 2018)

High quality research is demonstrated by the success of the researcher, e.g., in impactful publications (measured by quotes and visibility of social media). Open access to the research infrastructure of Aalto contributes to the success of the Aalto ecosystem start-ups and established companies. Strategic partnerships with selected high-quality international universities reinforce the brand of Aalto and add value to the development of studies, research, impact, and global skills. Open research, open (measured) publishing and professional data management research (measured open data sets)



attract new collaborators and advance the impact, visibility and multidisciplinary goals of Aalto through increased use of research data and results.

## **Aalto Research Data Management**

The research data management policy aims to facilitate data management for the individual researcher. Managing and curating data creates a competitive edge, and allocating funds for that is the strategic decision of the university. Publishing research data on open access is intended to make research data easily discoverable, accessible, intelligible, usable, and interoperable. The Data Management Policy of Aalto University applies to digital research materials produced, used, and revised in research projects, i.e., research data.

- **DISCOVERABILITY**

The location of research data and the software needed to access the information is known and can be easily discovered and identified through a standard global identification system.

- **ACCESSIBILITY**

Research data and the necessary software to access the data shall be easily accessible, along with other necessary information to access the data. It is possible to agree on an embargo period to attain the creator's strategic benefit. In connection with the material, the embargo period is articulated.

- **ASSESSABILITY AND INTELLIGIBILITY**

The research data and the necessary software for accessing the information shall be available and intelligible to third parties for scientific scrutiny and peer review. Research data shall be released in conjunction with associated science journals for peer review purposes. Research data shall be provided in such a way that it is possible to judge its reliability and the competence of those who produced it.

- **USABILITY**

The research data and the required software to access the information should be useable for reasons beyond the initial project. The research data selected for long-term conservation shall be stored and curated carefully to guarantee

its usability for broader requirements. Certified repositories are used for data preservation research wherever possible. Research data must be stored in conjunction with minimum metadata and paperwork.

- INTEROPERABILITY

The research data and the required software shall be generated in such a way as to ensure their interoperability with relevant norms and unique requirements for quality. Interoperability must be introduced in a manner that enables information to be exchanged in different nations between study organizations, higher education institutions, and research organizations. Interoperability will also enable various datasets from distinct roots to be re-combined.

Aalto properly managed research data to create a competitive edge because it means an important part of a high-quality research process. Moreover, optimal use and reuse of research data is a strategic goal of Aalto. To support this goal, Aalto provides proper storage where it collaborates with other service providers such as Google, Microsoft, Dropbox, CSC, and so on. However, this study focused on Aalto storage space and CSC.

## Store and Share

your research data  
in a proper way

ServiceP	ros (+)	Cons (-)
<b>Aalto Storage Space</b>	Has automatic backups, good for confidential data. Supports internal sharing.	Sharing outside Aalto is not supported. Not suitable for high performance computing.
<b>Cloud (Google, OneDrive, Dropbox, iCloud)</b>	Easy access and sharing	Not suitable for confidential data, no service guarantee
<b>CSC IDA service</b>	Large quotas available. Reliable long-term storage.	Slow for daily working
<b>Own computer</b>	Convenient for daily work	Risky for important information; may be stolen, broken, lost. Manual backups needed.
<b>External disks, USB, etc</b>	Convenient for short-term storage	High risk for data loss (lost, broken). Manual backups needed.

Figure 04. Aalto Research Data Storage (Aalto University, 2018)



## 2.2. CENTER FOR SCIENCE (CSC)

Center for Science (later referred to as CSC) is a Finnish center of IT expertise owned by state and higher education organizations in Finland. CSC is a state-owned, non-profit company with particular tasks. CSC develops, integrates, and provides high-quality information technology facilities as part of the domestic research scheme and ensures that Finland stays at the forefront of growth.

Owned by the Finnish government (70% shareholding) and institutions of higher education (30% shareholding), CSC plays a significant role as a tool for guiding and developing the education, science and cultural policy of the Ministry of Education and Culture. The company's success is measured in terms of how much value it generates for the owners (Csc.fi, 2019).

CSC's vision stems from the clients' desire for a bright and sustainable future aims at three distinct goals. First, valued by clients, implies helping their customers grow, explore, and succeed by working with them in the creation of a service. Secondly, to have high-quality experience and repatriating knowledge and economic advantages for Finnish society by engaging and actively influencing international development. The last is to encourage the growth of digitalization where information is the foundation for interoperability, reusability and easy accessibility. Along with their vision, research data management study with a user-centric approach is needed to use to gather many insights stressed on researchers and institutions.

Aalto and CSC want to develop research data management as a whole, from the researcher's point of view, to get a seamless path and process that best supports the research. The whole research life cycle needs to be considered to ensure that Aalto and CSC have the appropriate digital infrastructure in place. The process needs to be seamless so that the proper research data management would be the most comfortable choice for the researcher. Therefore, the project supports Aalto to implement a research data management policy. The project also supports developing the services towards the digitalization strategic goal of strong open data capabilities. Strategic partnership with chosen high-quality international universities strengthens the brand of Aalto and adds importance to the growth of studies, research, impact, and global competence. Aalto has developed an ecosystem of studies that draws the excellent people around

the globe to work at Aalto (measured by the university rankings from which our master learners, doctoral students, post-docs and teachers come). Extensive research, open (measured) publication and professional research data management (measured open data sets) attract fresh collaborators and advance the effect, visibility and multidisciplinary goals of Aalto through enhanced use of research data and outcomes.

## 2.3. RESEARCH DATA MANAGEMENT

According to Shedroff in Jacobson (2000), Data is the product of research, creation, collection, and discovery. It is the raw material that we discover or generate to construct our communications. Unfortunately, most of what we experience is simply data. In this study case, the data that will be discussed is the research data management.

Research Data Management (RDM) is the care and maintenance of the data generated during the research process. It is an integral part of the research process and helps ensure the proper structure, description preservation, and sharing of your information. No matter whether the researchers are an undergraduate, graduate, or faculty member working on a research project, managing the data well is one of the best ways to ensure standardization, reproducibility, and the ability to spread the study to other participants as well as saving time in the long run.

Properly managed research data provides competitive edge and is an integral part of a high-quality research system. A strategic goal of Aalto University is to maximize and recycle research data. While the objective is to produce data that is FAIR: findable, accessible, interoperable and reusable (Aalto University, 2019). Research data management is also making decisions about digital and physical research data and putting those decisions into action. It includes data collection, organization, storage, preservation, and publication. The benefits of RDM are: find your data, not losing your data, data remains accessible (always), data is in a publishable state, no duplication of research.

Research-generated data are precious resources that can be used and reused for future purposes of science and education. Proper data management procedures are critical to ensure that study information is of high quality, well organized, recorded, maintained

and available, and that their validity is always monitored. This results in research that is effective and excellent. Well-managed information can be readily shared and can, therefore, be used for current studies or for duplicating and validating current studies. Data management needs to be planned early on in research, so that practices can be implemented throughout the research cycle.

Research data management is important because of these several aspects:

- SECURITY: not lose your data in the future, protecting your data from misuse and theft
- VISIBILITY: maintaining and documenting your data, make a potential collaboration
- REUSABILITY: make your data possible to use beyond the fixed life span and period of projects and could create a potential synergy or a new project.
- PUBLIC FUNDERS AND PUBLISHERS: public funders wish the research data could be open to the public, the RDM even becomes a prerequisite in many EU projects.

# 3. METHODOLOGICAL APPROACH



There are many types of research approach and the main differences are their aims and objectives that can be seen in how the data are collected and analyzed.

This type of research is exploring the social phenomena and recognizes what people think, feel, or interpret various meanings and process (Given, as cited in Muratovski, 2016). As Leedy and Ormrod (2010) explain, qualitative research is to study the complexity of situations and many dimensions and layers of a problem (Leedy and Ormrod, as cited in Muratovski, 2016). According to Muratovski (2016), this is the most beneficial approach to gain an in-depth understanding of a particular problem when you are dealing with unfamiliar situations. In this thesis, the author did a literature review, stakeholders map, in-depth interview, and workshops as a creative approach.

### 3.1. CONTEXTUAL INQUIRY

#### 3.1.1. STAKEHOLDERS MAP

Research started with a stakeholder map to understand the position between the researcher as the user and Aalto and CSC as the service providers. This stakeholder maps assists in strengthening and communicating the main elements of a design project visually and pave the way for user-focused research and design growth (Martin & Hanington, 2012).

The author initially planned, reviewed, and defined the design phase, which is considered to be the critical stage of defining who all the main components may be involved in the design result. The stakeholder map seeks at providing a visual point of reference to plan user study actions and to guide proper communication with stakeholders throughout the project development phase.

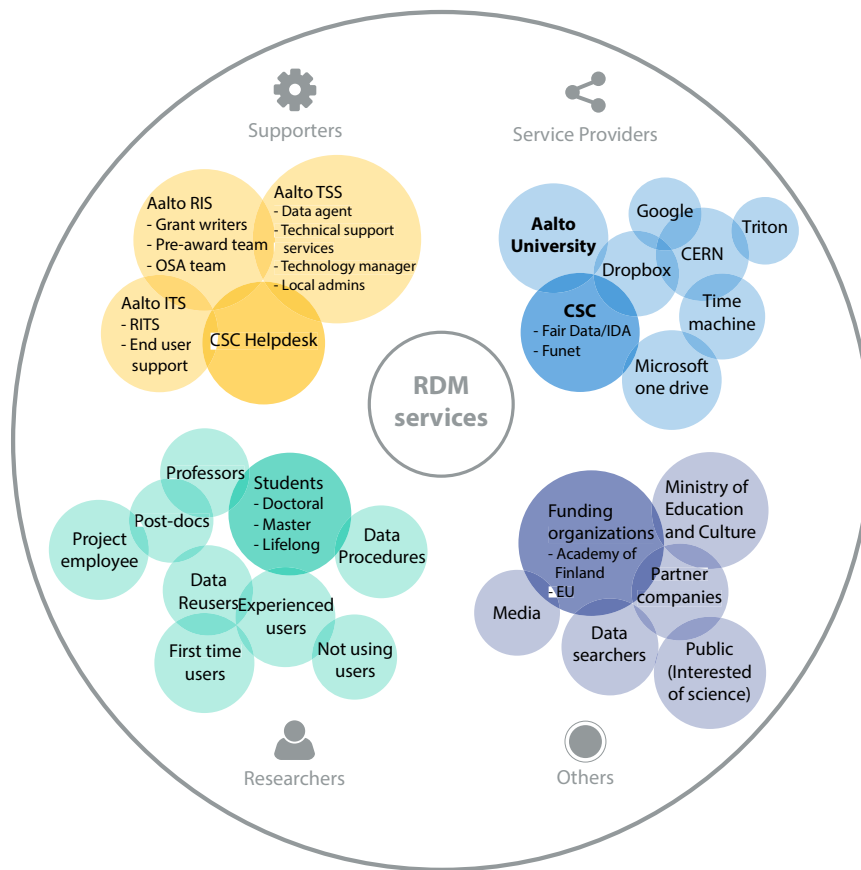


Figure 05. The Stakeholders Map

First, it is developed based on the brainstorming of the author and all individuals who contribute to the definition of the project. The stakeholder map can subsequently be recognized by a debate with Aalto IT staff, and the author recognized the project's stakeholders as four distinct organizations composed of service suppliers, proponents, scientists, and others relating to data management. These connections were then visualized through four separate lines of understanding and communication clarity for the team. Through this comprehensive diagram, stakeholder map shows and defined the key players clearly and the relationship between each other.

### 3.1.2. IN-DEPTH INTERVIEW

Interviews are a key technique of studies for contacting directly with respondents to gather personal experiences, views, attitudes and perceptions (Martin & Hanington, 2012). Interviews are performed in-depth as one-on-one sessions of discussion.



The objective of establishing an atmosphere of mutual trust and commitment to the situation at hand is defined by these kinds of interviews. The advantage that in-depth interviewing can offer is related to the interview situation's intimacy, even referring to having a friendly atmosphere in the case. Since my research questions relate to descriptions of personal experiences and interpretations of the RDM method, in-depth interviews are selected as the method for supporting methodology (Johnson, 2001).

There is no better way to comprehend the hopes, wishes and ambitions of those for whom you are planning than by speaking directly to them (IDEO, 2015). It is the author's opinion that interviews are best carried out in individual to recognize nuances of private speech and language, even if they can be done remotely. These kinds of semi-structured interviews provide opportunities for individualized conversations linked to the personal opinions of each interviewee. This enables the responses to flow to what the interviewees themselves seem to be the most meaningful circumstances (Johnson, 2001; Eriksson & Kovalainen, 20018).

The author conducted interviews with 29 respondents: 22 Aalto researchers, and 7 Aalto and CSC service employees. CSC storage users, Aalto storage space users, and CSC & Aalto storage space users are a mixture of the 22 researchers. The reason for having interviews with the various schools in Aalto is to gather the balance information of interview outcome. All interviews were conducted face-to-face, and three interviewees were recorded via Skype audio call. Each interview took about 60 minutes to complete. In the beginning, CSC chose the interviewees to those who actively used CSC service and stored a vast amount of data. Some of the teachers take their assistant or project team member, and this was a friendly initiative as the author can gather different perspectives where some information about research data are generally taken care of by the member, not the professor or project leader. Then my Aalto ITS supervisor's lists of researchers suggest the possible name depending on the sort of data they have from multiple schools. The first phase took place via email to contact them. For everyone, the invitation email was the same, including fundamental project data and a request to verify interest in participating in an interview. The author first sent personal invitation emails to the list of interviewees, obtained affirmative responses, and decided on the timetable. The aim behind this email was also to guarantee that participating in the interviews was voluntary.

The interviews were recorded and researchers were asked to clarify briefly their background such as school, project, what kind of data they have, and what kind of services they use. Some of them wanted to be anonymized to focus more on their journey of experience rather than their profile and also consider their project's confidentiality. Service staff interviewees were asked to explain their role, responsibility, the process of service development, results, and how they evaluate their service satisfaction. The author has prepared a basic question but sometimes enables flexibility diversions in a conversational format. Unstructured interviews sometimes lead to a discussion and make participants more comfortable, but rely on the author to direct the session and collect the necessary information within the allocated time. Organized interviews, however, can be seen as official and impersonal, but they are easier to control and more natural to assess problems and timekeeping. This also brought the stories onto a deeper level, which benefited the quality of the data. The unstructured format and versatile variants are used because this research is designed for exploration purposes. However, the author recognizes that the essential thing in complying with the session procedure is personally sensitive, adaptable, organized, and responsible.

### 3.1.3. AFFINITY DIAGRAM

Information is the first level at which it is appropriate to communicate with audiences, according to Wurman in his book *Information Anxiety* (1989). It is the transmission of thoughtful messages revealing the interactions and patterns (the context) between the submitted data. The transformation of data into information is accomplished by organizing it into a meaningful form, presenting it adequately, and communicating the context around it.

Therefore, the author choose affinity diagram as a suitable method to organize data gathered from interviews. Affinity diagramming is a technique used to externalize and significantly combine the results and perspectives of the research and to retain the development teams based on data (Martin & Hanington, 2012). By this, the collection of data was observed, learned, or laid in the author's mind, and transcripts were readily synthesized for interviews. Affinity diagrammatics assists designers capture research-based ideas, observations, problems, or requirements on individual sticky notes, enabling each individual to take into consideration the implications of design thoroughly. Notes will then be divided into affinity-based study subjects.



### 3.1.4. CREATIVE PROBLEM SOLVING WORKSHOP

Design workshops are a participatory design method that consolidates creative co-design techniques into structured meetings for various respondents to work with design team members (Martin & Hanington, 2012). Design workshops are effective, convincing, and enjoyable ways to build stakeholder confidence and input through activity-based studies. Although they can be intensive in organizing and running, design workshops are valuable in gathering attendees with a wealth of insight and in securing buy-in from team members and customers. In assessment sessions, respondents are brought together to review ideas jointly, provide feedback and give insights into the development and refinement of design.

Creative approach is used to collaborate with the relevant stakeholders using the creative problem solving workshop. The workshop used 'how might we' method which was developed at Procter & Gamble in the 1970, but has been more popular after being used by the design agency, IDEO.

The step is started identify a goal/wish/challenge by writing on the post it with "I wish ..." or "It would be great if ..." (IW/IWBGI). This then continue with selecting a goal/wish/challenge by sharing, mapping and voting the post its from every person. The last step is to write the challenge statements by using "How might we ..." (HMW). The target of the workshop is as follows:

- Collaborate with the stakeholders to choose the most compelling opportunity areas for users
- Understands the opportunities by reframing the pain points
- Inspire each other and building on each others' ideas
- Quickly find prioritize across all opportunities

## 3.2. SERVICE DESIGN METHODS

Before talking with the end users the author had to first understand the expert value in research data management, as well as what is their goal in building the service. The end users are the researchers from the various departments in Aalto University which consists of the professors, doctoral and postdoctoral students, and research employees.

The end users that had been interviewed have been active users of both services of Aalto drive and CSC.

There are distinct levels of service design transformative impact, related to the three kinds of customer relationships. Service Design tells human actors about service planning and growth procedures in the 'delivering' relationship, based on user-centered ideas, while influencing physical service resources/technologies. Finally, in the 'facilitating' relationship, service design enables customer organizations create their own capacity for viable user-centered development while at the same time achieving a greater effect on physical resources/technologies, human actors, procedures and routine (Yu & Sangiorgi, 2018).

At the beginning of the research, the author created a double diamond to draw steps plan from preparation phase to the delivery phase.

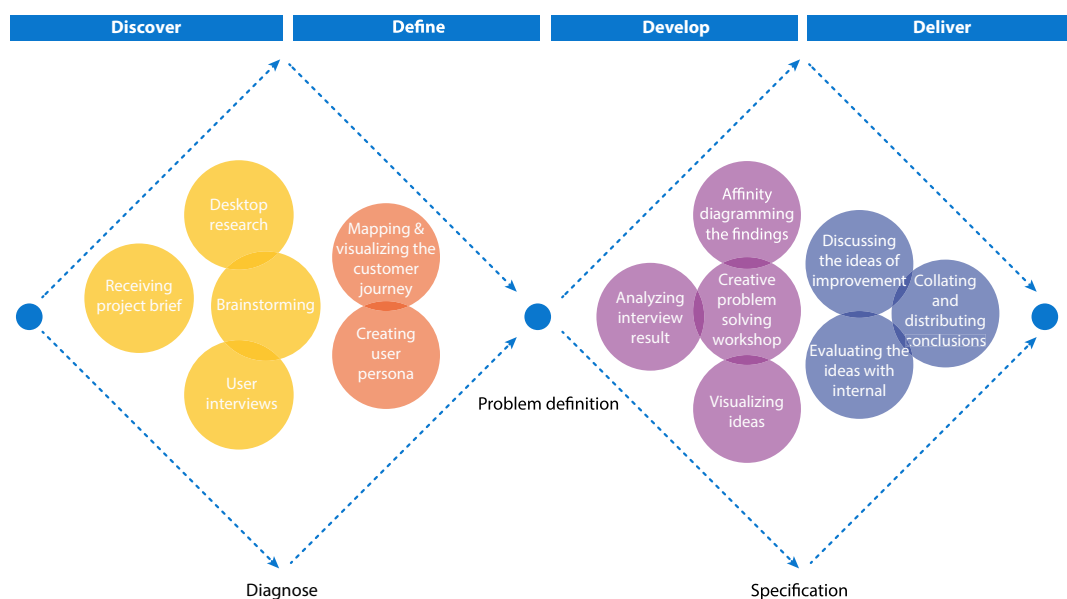


Figure 06. The double diamond

The double diamond is a model developed by The Design Council and it is divided into four distinct phases: Discover, Define, Develop and Deliver. These maps demonstrate how the method of design goes from points where thought and opportunities are as wide as possible to circumstances where they are intentionally narrowed down and focused on distinct goals.

Most agree that it is defined as an alternation between divergent and convergent stages, where divergence implies expanding options for solutions, and convergence means one idea being selected and pursued (Brown, 2009). This dimension of design thinking is often described as a 'double diamond' consisting of two subsequent pairs of divergent and convergent phases. Here came the difference between a first diamond that embodied the problem definition and a second one that framed a solution concept. These 'diamonds' form a process that is also articulated in four stages: exploration, identification, creation and delivery (Design Council, 2005).

The preparation begins with collecting stakeholder data and information about RDM facilities. Simultaneously, the author looks at the project in a new manner and also seeks inspiration. The objective is to build a rich knowledge resource with inspiration and insights and understanding the present situation of the service. The second quarter represents the stage of comprehension in which the author gathers inspiration, identifies the requirements of researchers, and develops original thoughts. Subsequently, the author develops an opinion and decides what is new and exciting and what inspires new ideas. All of these were performed using user interview and service people. Therefore, the author will be able to identify the opportunity or needs to be addressed through design. The third quarter marks a period in which ideas are created and concept shaped. Authors come up with prospective solutions concepts, and they also assist the author to enhance and refine the thoughts with the stakeholders through a creative problem-solving workshop. In this stage, all of the findings are synthesized to reduce the number of opportunities and analyze the outputs. The final quarter of the double diamond is developing and delivering stage, where stakeholders are also involved in the development of concepts into workable alternatives to finalize the solution that performs best for clients. During this phase, primary operations and goals are: approval, target, assessment and feedback loops.

### 3.2.1. PERSONAS

Personas are fictional characters created to represent user behavior patterns into the representative's profile (Martin & Hanington, 2012). Inspired by the user interviews and with all the findings gathered, personas are the result of the identification of user's value and behavior patterns during the research life cycle. An empathy map is a collaborative visualization used to articulate what we know about the particular type of user. It

includes knowledge about users in order to create a mutual understanding of user needs and help in decision making (Gibbons, as cited in Nielsen & Norman, 2018). Combine with the empathy map which consists of what the users think/feel, hear, say/do, and see and indicate what are their pain points and their goals. Along with this, researchers will come up with the scenario of how to support those personas to achieve their goals. This will help the designer to facilitate empathic understanding and communication among stakeholders.

The author chose an empathy map because it is a great background for the construction of the persona that we would want to create later. Empathy map helps consumers to comprehend the requirements of the individual we are designing while developing a deeper understanding of them. It enables the study of engagement with individuals in the field of design research to be summarized.

### 3.2.2. CUSTOMER JOURNEY MAP

According to the Design Council (2018), the User Journey Map is a visual depiction of a user's journey through a service that shows all the various interactions they have. A user journey map requires the point of perspective of the user and describes their real service experience. This enables us to see which parts of the service work for the customer and to recognize issues in fields where new items can be added or which elements (pain points) may need to improve. It also enables the author to comprehend the connections over time between all the various components.

Based on the users interviews, the research life cycle is the basis of the journey map in actual customer experiences rather than an abstract concept of how the service operates. With each stage, the author identifies the individual touchpoints-the people, information, products, and spaces that are encountered. As the map is created, links or gaps between touchpoints will be revealed.

### 3.2.3. SERVICE BLUEPRINTS

A Service Blueprint is a detailed visual representation of overall service over time - showing the journey of the user, all the various touchpoints and channels, as well as the

parts of the service behind the scenes that make it work. A Service Blueprint often feels like a User Journey Map, the distinction being that it maps the future service rather than the current one (Design Council, 2018).

The service blueprint is the combination of all the service touchpoints, as well as aligning the wishes and needs amongst stakeholders (Polaine et al., 2013). This method aims to connect and identify the interaction between external interactions (end-users) and internal interactions (service providers) by creating a visibility line. This method will be useful to show the correlation between one touchpoint to the other inside the whole journey.

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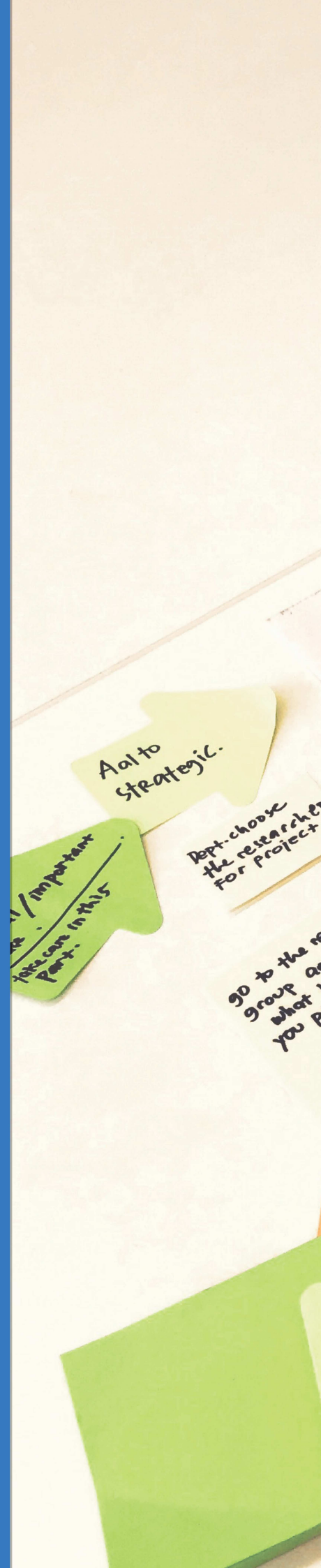
# 4.

## CASE STUDY:

### TOWARDS SUCCESSFUL RDM

This chapter presents the field research of the case study with the company. Then continues to use several common methods of service design, described in previous chapter. The author illustrate and visualize the findings of the research. A short summary answer at the end of the chapter and discusses the questions of the case study research.

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## 4.1. IN-DEPTH INTERVIEW ANALYSIS

The first step of analyzing the interviews was transcribing the recordings. These transcriptions focus not on the linguistic style or interactions but the content and phrases being spoken. This is because transcription is a definite act of representation that can influence how information is conceptualized rather than regarded as work behind the scenes (Oliver, Serovich & Mason, 2005). I also placed the highlight statements, thoughts, and ideas on small notes during the interviews. Later, having these little notes helped me trace back my process of interpretation. Based on repeating patterns into smaller themes, the results were written on sticky notes and clustered. The diagramming of the affinity was carried out to guide user interviews as well as expert interviews. Affinity diagramming is a method used to organize and make sense of large quantities of unstructured qualitative information, making it relevant to this study analysis method (Lucero, 2015). A vast amount of data collected through interviews, and thus, affinity diagramming was selected as the technique of data analysis. The author places the findings of expert interviews in a distinct color to differentiate between Aalto and CSC interviewee, then puts them in a particular theme of user interview results when intersected.

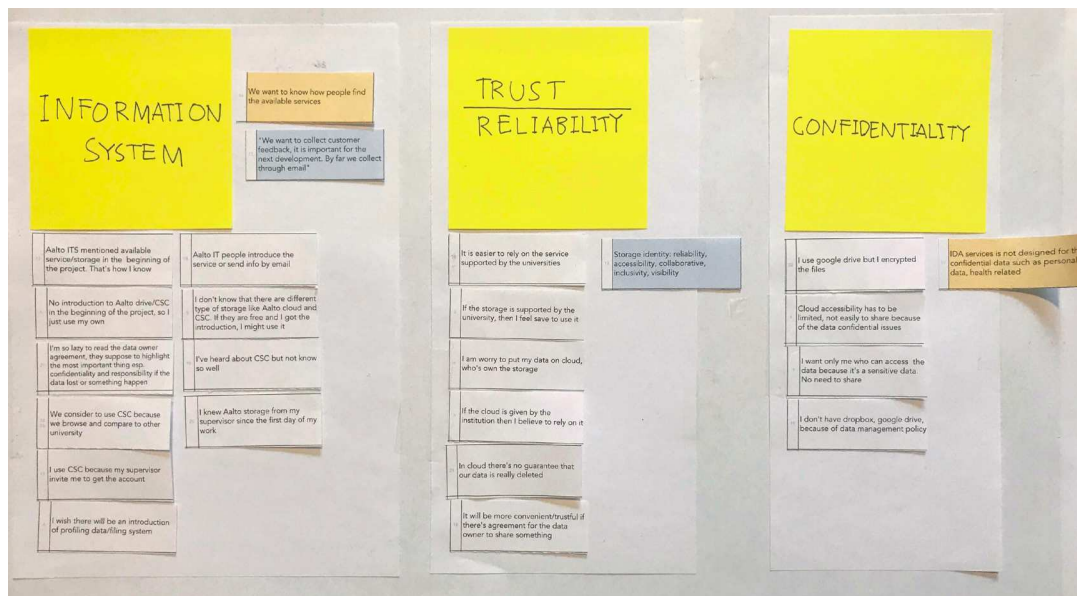


Figure 07. Example of affinity notes of the user interviews and expert interviews findings



The clustering resulted in nine (9) major categories for research data management classifications. These main categories were a support system, performance, integration, user-friendly interface, backup system, confidentiality, reliability, accessibility, and ownership. Six key insights were generated from the view of users based on these results, and three main conclusions were created from the viewpoint of professionals. Repeating patterns linked to the researchers' ideological journeys and their needs and solutions related to accessibility and inclusion of infrastructure and data preservation were recognized during the clustering of these main results. Here are some that I thought were the most important because it was commonly found in the interviews and often came up in different words several times; these key insights results were elaborated in the next chapter for findings.

## 4.2. AFTER THE WORKSHOP

This workshop idea came from the Google design sprint toolkit which is combined with the Creative Problem Solving workshop that author learn from IDBM Industry Project course. The Creative Problem Solving (CPS) workshop with stakeholders is needed to get a clear direction among several key insights. It aims at selecting the most compelling areas of opportunity for users, understanding opportunities by reframing the points of pain, and quickly finding priority across all opportunities. This workshop represents the human-centered strategy that promotes active involvement of users and stakeholders in all stages of research and design, including co-design operations. The author's role in this workshop was to manage the workshop process as a facilitator. As the customer owns the problem, they also have a position as the essential decision-maker or implementer responsible, or they all agree.

The most important skill for almost everyone in the next decade and beyond will be the ability to create valuable, compelling, and empowering information and experiences for others. To do this, we must learn established ways of organizing and presenting data and information as well as develop new ones (Jacobson, 1999).

Ideation Session Construction		
Part	Duration	What?
Instruction	5 min 10 min	Guidelines for sessions & ideation
Session 1	10 min	1.1 Project & Findings presentation
Session 2	20 min 10 min 5 min	2.1 HMW/IW/IWBG 2.2 Discussion in teams 2.3 Affinity diagram
Session 3	20 min 10 min 5 min	3.1 HMW/IW/IWBG 3.2 Discussion in teams 3.3 Affinity diagram
Session 4	20 min 10 min 5 min	4.1 HMW/IW/IWBG 4.2 Discussion in teams 4.3 Affinity diagram

Table 01. Ideation session configuration

The workshop started with lightning talks about the user research process this far, the method used and ended up with sharing all of the findings on a whiteboard, where the findings are categorized by similarities. An extensive discussion took place between the author and IT and CSC personnel about findings and participant quotes from the interviews. This happened to warm up the workshop while establishing ownership in RDM Services project at the same time and having the same common ground about the user's insight.

Afterward, the workshop will be followed by an idea description of "How Might We," "I Wish," or "It Would Be Great If." This is the stage when you hear the pain points and then reframe them. The participants have to write down and say it loudly because it will simultaneously develop other ideas so that others can be inspired or even write down more notes to build the previous idea. I nudged the participants to start the idea as the discussion kept going. The guidelines also guided the attendees to examine the previously discussed findings. This approach is aimed at achieving quantity over perfection, we are more focused on getting as many ideas as possible and explore the outcomes. All these ideas came about 35 minutes from the analysis of the findings.

The next phase is to share the opportunities that the team recognizes on the whiteboard. Before the group shares its sticky notes, the authors remind everyone that this phase should search for and classify possibilities, not issues or alternatives. At this point, the team will widely support and discuss as many views as possible. An active affinity group took time to develop in common with How Might We (HMW) / I wish (IW) / It Would Be Great If (IWBGI). Integration, collaboration, fair access, clarity, data management, intuitive, easy to use, and secure were the categorization results.

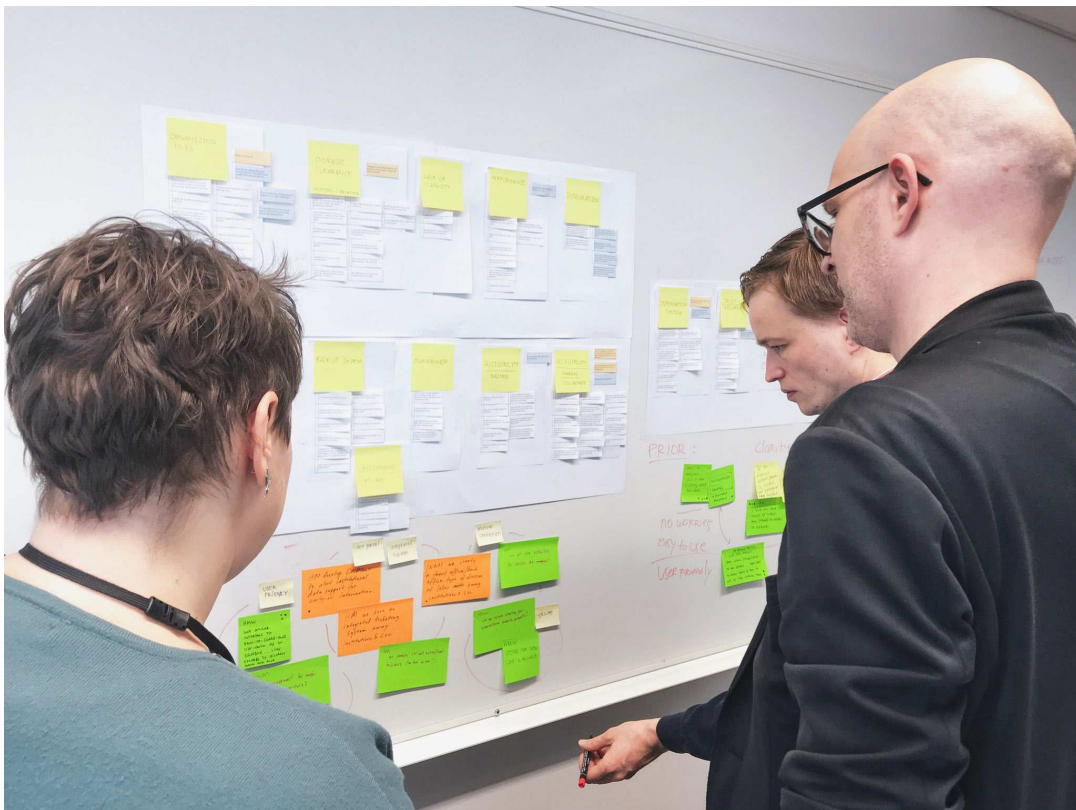


Figure 08. Creative Problem Solving Workshop

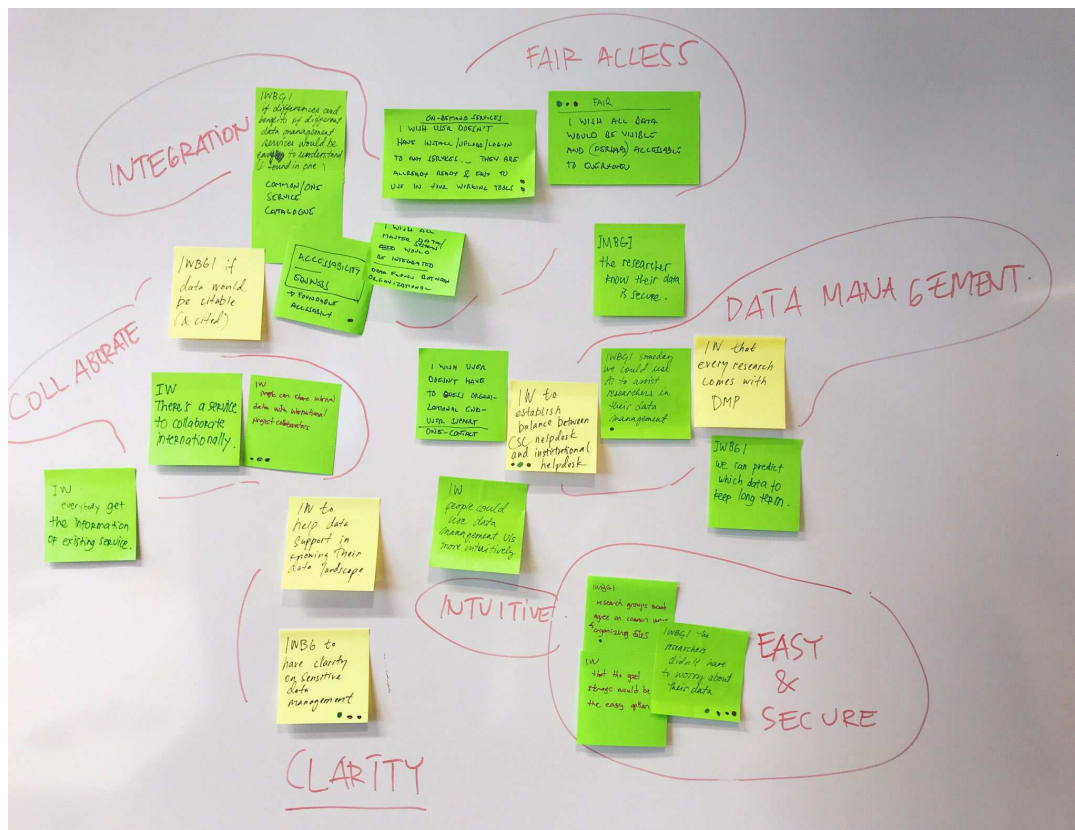


Figure 09. Affinity diagram and dots voting

The next phase is to identify the opportunities in which the team votes on what occasions it considers essential by voting at points where every team member proposes. The points are based on criteria, which one is important or which one you can influence. The main objective of the vote is to highlight the most convincing opportunities for researchers and to help the team concentrate on the best ideas. This vote was not intended to restrict itself to one idea, but to prioritize all opportunities quickly. What is the most exciting, most pressing challenge, or what challenges do you want to do? Each member of the team got three votes, not categories on the individual notes. It is shown by points added to the sticky notes and allowed to vote on their sticky notes. Notes with multiple points were highlighted as the Sprint progresses. These topics resulted in safety, usability, clarity, sharing, and organizing.

This process is repeated throughout the voting process in order to reach a group consensus on one or two ideas for the Sprint focus. The conclusion is not necessarily the result but rather the direction of design that inspires concrete actions for RDM development. It was directed to obtain a user-friendly Dropbox interface sharing platform and to create a type of front office division between the institution and CSC.

### 4.3. FOUR PERSONAS TO DESCRIBE AALTO AND CSC STORAGE SERVICE USERS

A User Persona is a character in a readily recognizable and understandable form that embodies user research. To generate a single character that represents the group, it brings together loads of data about comparable individuals. Personas are a helpful guide for helping consumers to stay focused and value (Design Council, 2018). The author added the empathy map to bring a more understandable explanation of the persona and to give a real scenario of them. An empathy map summarizes the lessons learned from people's involvement in design studies (Dam & Siang, 2019). It comprises of four quadrants demonstrated by the user during the research phase. The four quadrants are the users: Say, Did, Thought, and Felt.

Personas consolidate archetypal user behavior pattern descriptions into representative profiles to humanize the focus in design, test scenarios and communication support design (Martin & Hanington, 2012). Crafted from data gathered from actual consumers through sound field research, persona offers an ideal solution through the capture of common conduct in meaningful and narrative profiles. Once the author has gathered sufficient data to describe various users, the author examines conduct patterns and topics which are commonplace. The human description promotes natural empathy and communication and generates important design goals for accountable design.

In order to maintain a manageable focus on design and avoid targeting extreme outliers, the amount of personas should be limited. Four main personas were developed in this project based on the research experience's in-depth interviews. The categorizations describe their goals, their file organization behavior, the type of data they maintain, and how they preserve the data. These users made service providers aware of what steps they need to take to support their goals. Personas should describe the motivations and goals of people, not just their age and gender. The resulting paper reminds the research process authors and will hopefully enhance stakeholders' knowledge of their customers.

There are four main user groups made based on in-depth interviews with the researchers. Persona aims to communicate the behavioural patterns and themes that represent common characteristics. The categorisations describe their similarities in research goals, ways in organizing RDM, and how they choose and get information about service providers. The four user typologies are: the Supporters, the Decision Makers, the Influencers, and the Doers.







## THE SUPPORTERS

Supporters represent people who understand RDM services. Everybody could contact the supporters when they found something occurred on their cloud storage, personal computer, or somewhere else where they keep the research data. If the researchers found that their storage is not performing well or needs bigger storage capacity, the supporters will solve your problem.



Figure 10. The supporters, illustrated by Rahel Manurung

Usually, the researchers will directly seek help from the supporter as someone reliable and expert in this field when there is a problem with the digital data. However, there may be different kinds of issues among many researchers, students, and staff, from very easy to complex one. The speed at which the problems are solved is the problems faced by the limited number of supporters.

Introducing Miko an IT guy who wants always to give his best to check what is going on and quickly find the solution. He reads a lot of Aalto people's emails every day but is eager to answer and fix the issue. Miko tries harder for the users feel satisfied with his work and gets no complaints about it, because at the same time his goals are to solve customer problems quickly, maintain performance, ensure that the data is secure and the important thing is to provide researchers with clear information so that they can repair their problem on their own.

## THE DECISION MAKERS

This person reflects both the professor and the leader of the project. They have the capacity to choose which service provider their team will use. Usually, they are a long-term service user because they already know a particular service, store a lot of information and vital information. In that sense, it could be avoided to transfer the research data out and learn how another service works.



Figure 11. The decision makers, illustrated by Rahel Manurung

Konsta is a professor who has spent more than ten years working in Aalto. At the start of his project, he was introduced to various current services in Aalto by IT individuals in his department. He then chooses the one easy-to-operate and secure service provider. During the project, he was satisfied with the results of the service provider he wanted and suggested using the same provider to his assistant professor, teachers, and Ph.D., so it would be much easier for them to share information and cooperate in the team.

As a professor, Konsta has an enormous quantity of raw information, the thesis of students, and simulation. His assistant, fortunately, enables him to handle and organize the research data. The assistant also helps him find the files that can't be found readily in tons of file arrangements. Some information that feels essential will be placed in Konsta's USB and personal computer, even the data stored in the hard drive released from a computer and placed in the drawer.

## THE INFLUENCERS

This typology of users valued their curiosity in finding the most effective technique for organizing research data, identifying requirements within their research group, looking for existing services and prospective services for future use. Influencers are informal research data staff, but they are more individually-based to provide the best alternative for their team.



Figure 12. The influencers,  
illustrated by Rahel Manurung

Mari is a doctoral candidate and assistant to his professor. She is actively searching for the existing services both what Aalto sources have and what is available in other universities. Based on his desktop research, she will compare those services then advises her supervisor about her findings, for instance, new collaboration tools or a user-friendly platform. The professor, who is also her supervisor, usually discusses with Mari about several issues, such as data transparency, simulation, and possible collaboration with other universities. Mari captured these issues as the reason to try another service provider, which has new features that are more suitable for their project.

When something happens with their research data or IT tools, Mari also becomes a contact person for her colleagues. That's just because they found it much easier to ask for help

from Mari before contacting IT people in their department. At the beginning of the project, Mari had no introduction to the available service providers, so she looked through the Aalto website, forum discussion, or from other sources intuitively. The professor placed trust in her; however, as Mari was considered a member who brought the news and made people aware of the digital trend that is going on.

## THE DOERS

The last typology of the user is the doers themselves, the researchers. Researchers manage their research data differently because they have different approaches and practices dependent on each individual. Although they have different ways and familiarity with managing their data, the goals remain the same, avoiding the mess of organizing data and making sure their data is secure.



Figure 13. The doers,  
illustrated by Rahel Manurung



Anna is a Ph.D. student, and Joona is a postdoctoral, who both come from the same department, from Neuroscience and Biomedical Engineering. While Anna is more casual and on her filing system using color or project date, Joona follows the regulation from naming the project to archiving or deleting data. Anna realizes she has quite unorganized files and finds it challenging to search her folders at times. However, Anna recognizes that there is a data management movement and Aalto also has a data management plan seminar to assist their researchers in many ways, such as generating metadata, analyzing before the project starts, and preparing for future preservation. So she wants to be able to organize her information neatly, discover it readily, and work more effectively.

Joona has confidential information because it is linked to human health, so he takes care of the details of her research and starts the project with the filing system, in particular, following the regulation. This made his work in the research group practical and straightforward to locate the documents to share. However, he wants expanded access to information to cooperate with peers from other colleges outside Finland while at the same moment, ensuring that his information is secure.

Anna and Joona both have some data stored in their private computer because they think online storage information has taken so long to relocate. Even so, they put some of the data on the cloud so that they also have an automatic backup system to prevent data loss unintentionally.

## 4.4. CUSTOMER JOURNEY

A customer journey map provides an overview of the experiences individuals have when interacting with products or services in order to evaluate and improve each moment (Martin & Hanington, 2012). This map is an honest representation of an experience, and includes moments of indecision, confusion, frustration, as well as delight and closure.

Through the comprehensive discussions, this user journey map helps to develop a shared vision about ways to more effectively augment existing user behavior within their actual contexts of use. To fully understand the needs and concerns that the researchers have and behavior patterns related to the research life cycle, the author built a customer journey map. The customer journey map is a method to map out the user experiences through an entire service (Kumar, 2013). Having the customer journey will help to find the pain points and touch points in each situation. By weighing the values for the researchers, the ideas of improvement are generated and further discussion and evaluation with the stakeholders is needed.

As outlined before in Chapter 3, it is essential to observe the overall customer activities, service activities and service duties where these activities connect with distinct phases of customer experience in order to be able to comprehend complicated service processes. I developed a customer journey map based on the life cycle of the research. The focus of this method was on Aalto and CSC service and external stakeholder activities, which were deemed to affect the Aalto researcher process. I have split the customer journey map into four components, one for each primary activity: 1) Preparatory, 2) Research and Development, 3) Dissemination, 4) Wrap Up.

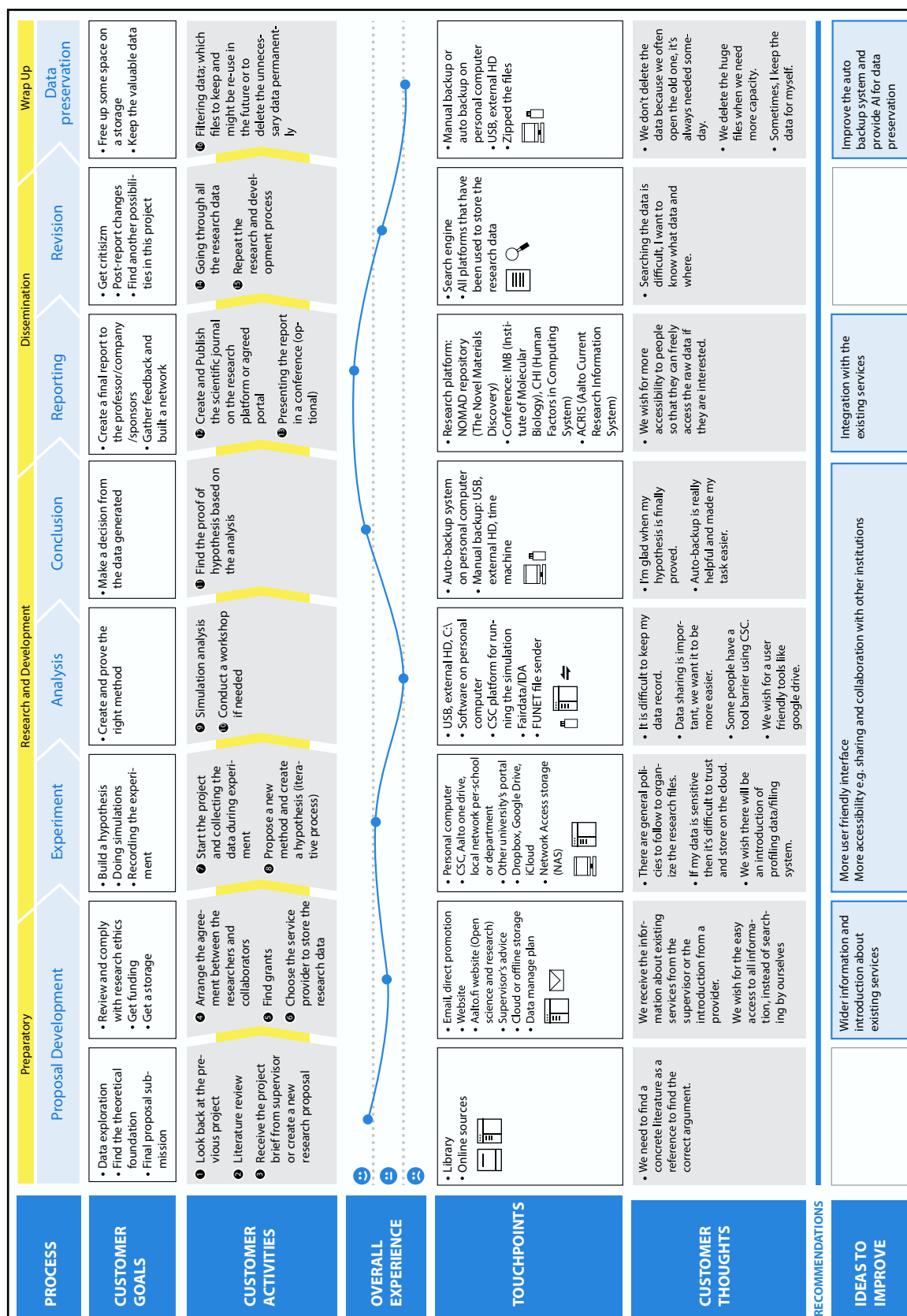


Figure 14. The Customer Journey Map

## PREPARATORY

### Proposal Development

Preparatory is a stage that addressed at the very beginning of the project. This phase will help the researchers to think constructively about research data. Ownership, clarify at the start of the project about who owns the data, who can publish the data, and who can take the data. In this proposal development also, there is an activity of collecting the data if the researchers are dealing with human data then they might need the consent forms which is covered how data will be stored, used, shared, or kept confidential. To get funding and choose the service provider before starting the project is also the goal for this stage.

## RESEARCH AND DEVELOPMENT

### Experiment, Analysis, Conclusion

After preparation, the second phase is the actual research itself. The research and development are grouped into three processes: experiment, analysis, and conclusion. Build the hypothesis, do the simulations, and record the experiment during this phase to generate or prove the right method. Much information is created, such as experimentation, simulation, and analysis, and data sharing and collaboration are needed.

## DISSEMINATION

### Reporting, Revision

When the project is completed, it is the dissemination phase where the researchers need to create a final report to the professor or company or funders and then publish and share on the research platform the scientific journal. Some researchers may have distinct responsibilities concerning their necessity for financing. The research results submitted in the conference will provide researchers with an opportunity to learn valuable information from individuals working on comparable programs and research.

## WRAP-UP

### Data Preservation

The last one is the wrap-up stage linked to the preservation of data. Filtering data occurs where researchers need to free up some space to store and filter data on which files to delete, store, and maybe reused in the future or continuously delete unnecessary data. Researchers must ensure that the information is saved safely in this preservation and storage phase so that it stays available and consider to whom it can be shared. It is also essential to have a backup; the file used to restore information when the master file is lost, damaged, accidentally deleted or altered incorrectly.

## 4.5. THE SERVICE BLUEPRINT

Service blueprinting is a customer-centered strategy used to map client journeys in connection with supplier actions. This method is used to better understand a customer's view of service interactions and organizations. It identifies service deficiencies and allows the supplier to create choices to reduce the risk of relationship weakening (Shostack & Zeithaml et al., as cited in Meroni, Anna, & Daniela Sangiorgi, 2011).

A Service Blueprint map was developed to summarize each persona in order to comprehend the overall continuing service in Aalto and CSC. The interactions and customer relationships, front-end services, and back-end services are visualized through the blueprint. It enables me to comprehend the service system in a holistic way and also enables me to interact with stakeholders once we assess the improvement ideas.

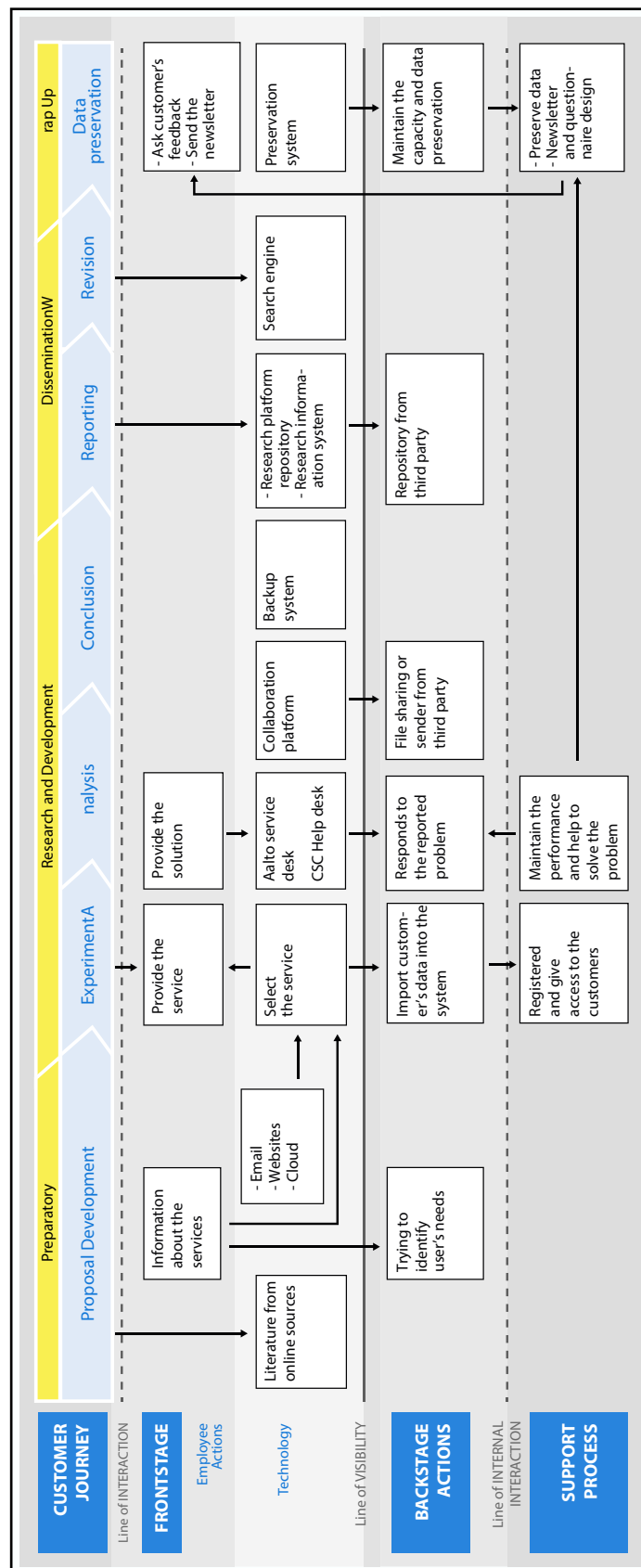


Figure 15. The Service Blueprints

## 4.6. FROM FINDINGS TO INSIGHTS

Some problems in the interactions were documented after mapping out the customer journeys with all the challenges and expectations. These results are categorized on the basis of the four user journeys.

### HOW TO SUPPORT THE SUPPORTERS

First of all, before constructing a network with them, it is necessary to define which one is the supporter so that they can achieve as many researchers as needed. Aalto IT must also provide followers with all the data they need or even offer them access or admin rights so they can fully understand and know how to fix the issues.

### HOW TO SUPPORT THE DECISION MAKERS

The service provider needs to maintain the account of decision-makers, mainly as they are a long-term consumer in order always to fulfill the service and become a loyal client. While having this scenario at the same time, decision-makers will be encouraged to appeal to their team members and colleagues to use the same service provider. IT support, however, needs to ensure that decision-makers comprehend Aalto's strategic data management targets, such as data policy.

### HOW TO SUPPORT THE INFLUENCERS

Influencers are unique users because they can be found on the basis of their initiative as a doctoral candidate, student, assistant professor, or even the professor himself. Recognizing and educating the influencers is an advantage for IT personnel because they can assist the researchers to get the data they need, and their updates seem ready to join the tech watch community. Once identified, IT people also would provide them with legal changes, such as GDPR problems. Unfortunately, identifying the influencers is not easy because they rarely contact IT assistance as they attempt to discover the answer on their own to fulfill their curiosity.



## HOW TO SUPPORT THE DOERS

Research data management information did not reach the researcher equally.

Therefore, generate an entry-level where all the data and regulations are required for the doers is needed. Hopefully, the researchers will discover the data management information readily before beginning their project. Also, the current Aalto service provider should be able to make it easier for doers to store their confidential information and to share more wide access to cooperate with other peers from distinct colleges and other nations.

## KEY FINDINGS FROM USER INTERVIEWS

### ACCESSIBILITY

*“We are looking for a sharing platform, transparency, because perhaps other researchers need our data or they can add something.” -Professor, Department of Built Environment*

This interviewee wants more comprehensive collaborative access. The research is conducted not only internally in Aalto, but also with the corporations and other universities in Finland and overseas. It is straightforward to share and cooperate internally when researchers using Aalto storage room and CSC service, but it is difficult to access research data for the colleague who came from non-Finnish universities. In an environment where there is more collaboration, the accessibility of data storage for research should also be expanded.

### RELIABILITY

*“If the cloud is given by the institution, then I believe to rely on it. I’m worried to put my data on cloud. Whose own the storage?” -Doctoral Candidate, Department of Design*

The interviewee is very concerned about their information being safe. They want to understand where the repositories are stored and who owns them. They make sure they use a service provider that is trusted. The researchers I interviewed have distinct data types, such as open data, semi-open data, and confidential or sensitive information. Their funder and collaborator also have particular requirements as to how they should

maintain and share their research data. If the funders and collaborators did not facilitate a specific research data storage service, the researchers could use university storage because they are trustworthy and safe. Institutions have IT teams, to depend on their information and ask if anything happens.

## PRESERVATION

*"I never delete the files, I might need it in the future."* -Doctoral candidate

*"I keep the raw/old data because it is a process. The extension of the project might happen."* -Doctoral candidate

The wrap-up phase of data preservation is the stage where interviewees feel many tasks to do because they have to go through all the data they have. Some interviewees filtered their data because they only want to maintain the essential and free up some spaces, while others also keep their data as it is because they may not be beneficial for other studies in a distinct way. The exciting things are, the professor sometimes found the old data that nobody knows who the owner is and nobody wants to delete because they don't understand the significance of it. On the other side, some researchers who have just left all the study information as they are, because they feel a lack of time to sort it out. However, all the interviewees understand that data preservation is necessary for the future, in this case, the question is how to make the wrapping up easy so that they want to organize and archive the research data.

## OWNERSHIP

*"I use my personal storage because I want to keep my data after graduation."* -PhD candidate, Department of Civil Engineering

The feeling of ownership is a natural occurrence because the interviewee feels that they are owned by the research data they have generated. The researchers believe some of their data is important, and they want to keep it if they graduate and don't go on with Aalto one day. Their information could be produced in another research form, so they would like to maintain it in their personal storage.

## SYSTEM INFORMATION

*"I wish for the easy access to all information about existing services."* -Doctoral candidate

Before starting the project, not every interviewee gets the introduction of current research data services. Some have been actively looking through the website of Aalto or finding out what other universities utilize. Nevertheless, it would be useful if the information could be distributed equally to each school in Aalto so that none of the researchers feel that they are doing an unnecessary job. The information should be expanded and easily accessible to reach as many researchers as possible. It is essential to distribute the information as soon as possible because it is crucial to understand them in the preparatory stage so that researchers can compare and select the service that best suits their needs.

## USER-FRIENDLY INTERFACE

*"I have difficulty in using CSC interface because I don't have an IT background. I'm struggling using their commands."* -Post Doctoral candidate, Department of Electrical Engineering and Automation

The interviewee is more convenient to use a universal and intuitive interface. With the various educational backgrounds, they have a different understanding of operating a system. Not every Aalto researcher has an understanding of computing when using specific commands. Specifically mentioned about the CSC platform, some interviewees wanted to store data, do simulation, or archive files using an easy-to-understand and operate interface service. Universal platforms like Dropbox and Google Drive are much easier to use. Nevertheless, the database owner of that repository had become a concern, especially with sensitive data for researchers.

## KEY FINDINGS FROM SERVICE PERSONNEL INTERVIEWS

### INTEGRATION

*"It would be good if every data management service is integrated. Currently there are a lot of instructions, seems complicated and many sort of tiny details." -Anne Sunikka, Head of Open Science and ACRIS*

There are many data management services in Aalto, but unfortunately, they are a kind of service that is not connected to each other and sometimes overlap with their purpose. ACRIS is the Aalto Research Information System that stores university-level research information. The institution needs to understand what has been accomplished to researchers to have a proper database of research data and is also useful for the accreditation. However, not all researchers report their research to ACRIS because they felt that after posting in particular research publication portal, they accomplish their obligation. Indeed, as an institution, Aalto found it challenging to collect the published research altogether. In that sense, integration into this complicated system would be excellent. It would also be much easier for the researcher in Aalto with the embedded structure if there is no need to have a double submission of their published research so that they can spend their time to work on the actual research more than the paperwork as their duties.

### REPORTING SYSTEM

*"We want to have research reporting because we need to know what researchers have done ... Researchers should understand which one is potential commercialization, like a patent, it's valuable!" -Maria Söderholm, Open Science and ACRIS Team*

How to educate researchers to understand that it is essential to have their research on reporting system for Aalto. One of the benefits of reporting before publishing it is that the university will advise researchers if there is potential for commercialization of their research, e.g., patenting. Furthermore, the research data for each department must also be well documented in the same way. It's beneficial that Aalto has metadata generated in every research. At the same time, there was hope that the data could be moved automatically to ACRIS as the first information for Aalto after the researchers fulfilled the publishing requirement.

## PRESERVATION

*"The service is success if we have a long term preservation, things we keep have to be used in the future ... very easy accessible data and easy to find and download."* -Susanna Kokkinen, Manager, Record Management in Aalto services

As a prestigious university, Aalto should have a visionary data management plan. How to retrieve metadata, how to store and archive files for easy finding, and accessing long-term conservation. The information should also be well defined of who, what, and why it is collected for this purpose. Research information may be engaging in the next ten years or may be used in entirely distinct ways for other researchers, while at the same time it is difficult to predict which research data is useful to maintain or which one is essential for specific fields. Another issue right now is that Aalto has no media repository. The School of ARTS, in particular, has tangible things as its study results such as pictures, paintings, prototype, and so on are the present issue of keeping this valuable information digitally.

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# 5.

## DISCUSSION

This chapter evaluates and discusses the method and service design result. This process explores the integration of Experience-Based Practice in assessing interactions in tools for service design. The findings and insights are revealed and also mapped to a model based on experience practice. The thesis is finalized by answering the main question and making suggestions for further research.

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The RDM research engaged overlapping tool, stakeholder, and resource. Interestingly, previous study reported Evidence-Based Practice (EBP) that also involved 3 overlapping circle of research evident, customer preferences, and resources including expertise. EBP model has important implications for both academia and practice. Firstly, it is capable of providing a useful framework for guiding research data management with an interdisciplinary and real-world perspective. Secondly, it is reported to produce decision-making, which also involved several overlapping sources. The validity of the technique used in this RDM research is indicated by this EBP model.

In 1996, Haynes and peers launched the conceptual “The Three Circles” which described how to study into clinical practice in medicine is to be integrated (Haynes et al. 1996, Satterfield et al. 2009). The technique then became a core competency for health professionals, as the preparation of practitioners in healthcare professions is diverse, and so often the vocabulary, conceptual frameworks, and techniques of studies vary, while unification aims are significant. A harmonized transdisciplinary model was offered by the EBP method to promote cooperative activities between knowledge, study proof, and user preferences.

The Evidence-Based Practice improves decision making by using clear, well-researched, and demonstrated justification for why we do stuff in certain respects with the ultimate objective of continuous changes, learning and excellence in the organization. It is about creating and promoting best practices and thinking, looking at the actual proof on that question and considering it critically.

EBP method means the competence to acquire and evaluate relevant proof, to apply it by joint decision-making, which takes into account the customers’ resources, to analyze results, and to adjust as suitable. The EBP had a history for several developments such as medicine, nursing, psychology, social work, and public health. This means EBP had successfully worked across the discipline. EBP deliberately stresses the function of expert power and encourages instead a transparent and reasonable decision-making process, which all knowledge in the framework can teach, improve, and apply.





Figure 16. The EBP model diagram

Based on the venn diagram above, the main idea solution per each phase that is proposed by the author are as follows:

1. *Preparatory* - Enlarged information and introduction of current services
2. *Research and Development* - More user-friendly interface and more accessibility, for instance, sharing with other institutions and collaboration
3. *Dissemination* - Integration of university and third-party services
4. *Wrap Up* - Improve the scheme for auto backup and provide data preservation Artificial Intelligence (AI)

## CONCLUSION

The main aim of this study was to understand the current service of Research Data Management (RDM) at Aalto University, and how to integrate the service design approach to build a seamless path and process that best supports the research. Based on the wishes from the case organization, the target group of this research are the researchers from varying departments at Aalto. Service design tools were found to be useful in developing RDM. Service design method revealed the user's emotional experiences and catch the hidden needs, which is valuable to improve in future service development. Knowing and documenting the insight and define user's pain, gain, and wishes can take preventive actions and make service design solutions more robust.

Service design tools have exposed the link between the service provider and customer by defining touchpoints to formulate the ideas of improvement. The customer journey map had explained the researchers' entire journey in-line with the research life-cycle process. Through this map, the author can discuss the challenges and opportunities together with stakeholders and the wishes of users on systematic grounds. The persona method has revealed many exciting customer categories, both official and unofficial, that IT supporters would optimize their position. One of these roles has been described as the decision-maker representing the lead professor or the project leader simultaneously. They are usually the ones who determine which sort of service in their project would be used. Since they are a long-term user of particular storage, the comprehensive prior experience is likely to have a significant impact on the expectations of using the storage and assess the preferential use of services. The typology of users called the influencers, however, is considered to be an extension of all the necessary information and to support the existing services as they actively search for available services and recommend their results to their professors.

Communication plays a crucial role in efficiently delivering all available resources before the researchers begin their research. The introduction of services was disproportionate, and not every department was aware of the services available at Aalto. In the preparatory process, IT supporters should be able to introduce and suggest the correct service so that researchers can choose the best system to store their data and provide better guidance on how to coordinate the RDM. IT supporters, on the other hand, have to learn more about their clients, recommendations, culture, and how they document everything. Although they do not have enough people to support at the same time, it is crucial to know how the system works in each department by the notion of supporters' rotation. Furthermore, IT supporters need to know what kind of tools each department uses because each department has different needs according to their type of data.

The future repository should be considered digitally for specific data such as prototype, paintings, video, and many more. Among the various types of research data, universities and service providers must facilitate valuable research data that exists in many formats. Each effort is important to the goals of research data management FAIR data principles to make data findable, accessible, interoperable, and reusable. Improving the FAIR data principles of RDM services is essential not only for the researchers but also benefits the broader society, such as lifelong learners and educational affiliation. Therefore, if the existing RDM systems were improved in terms of the areas discussed, RDM could become more accessible, implying that access to knowledge is also a human right.

## IMPLICATIONS

This research is influenced by power and status; this could happen either because of access to funds or virtue of status (Muratovski, 2016). The author encountered this challenge during the evaluation process. The selected findings to be developed were considered wisely, mainly according to the long-term development of financial consideration.

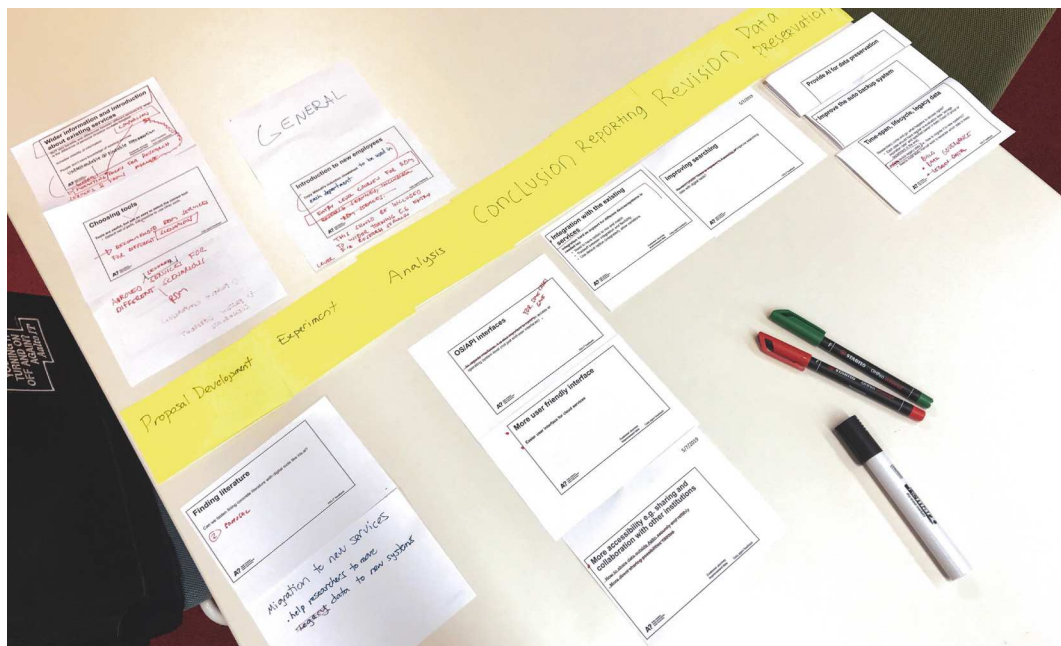


Figure 17. Discussion for ideas validating with internal Aalto ITS

The author did an internal validity as a suitable phase for this particular case study design. This kind of validity concerns the inferences made by the author. As conclusions in qualitative research are often types of inferences made by the author, it is important to provide critical and reflexive analysis. The discussion is done together with people from Aalto ITS, Ilari Lähteenmäki (Thesis Advisor and Project Manager) and Juha Juvonen (Head of IT Solution for Research). After three months since the discussion conducted, some progress has been made at Aalto IT. The advisor then suggested discussing the recent situation and how things are going on data management development in accordance with implementation ideas. This discussion held with Liisa Länkä (Head of IT End User Support) and Oskku Kaijalainen (Customer Service Supervisor), and as a result, the validity and ideas improvement are visualized in the following diagram.

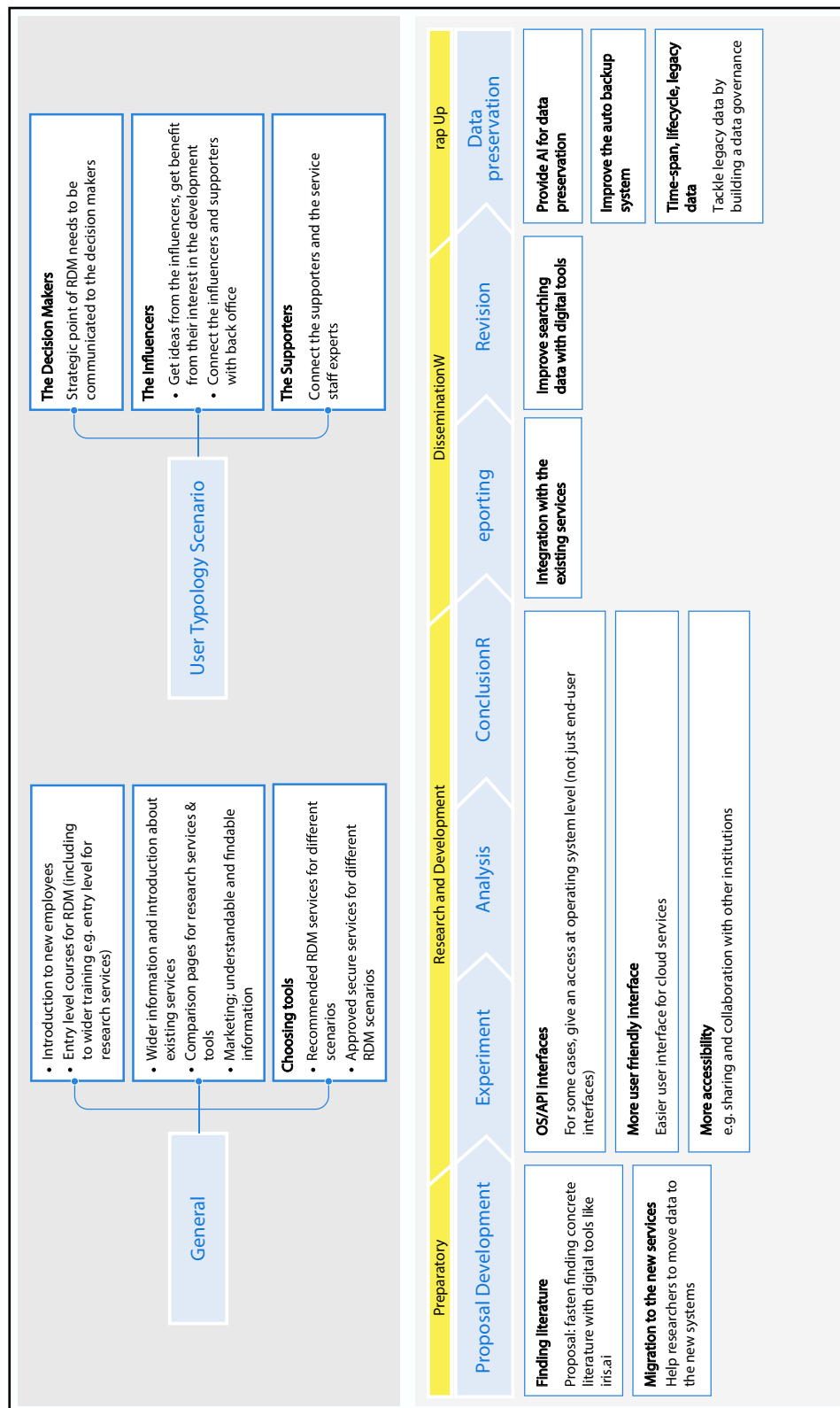


Figure 18. Diagram of ideas improvement after internal validation

## *SYSTEM INFORMATION*

The information is crucial at the beginning of the research process. Many researchers did not get the balance information on the existing services before beginning the actual research; some got it from colleague or professor through word of mouth, and some found it on its own. Until now, there is no formal introduction of the existing service from IT support to the researchers. There is only a brief overview of about 5 minutes that IT supporters can address at the onboarding process. Sometimes, the introduction is not provided by the IT supporters, and this caused the researchers to have unclear information. This might be because the level of the department is not always connected to IT services that have led researchers to lose out on many occasions. Therefore, it would be better if the IT supporters were included as the right person to provide explanations in the onboarding process, for instance, so that the researchers would be clear about the whole IT services related to their research.

Creating RDM entrance level courses and creating a comparison page is one of the strategies for broadening information and introducing existing services. The comparison pages also used to show the available research services and tools in detail, making the information more comprehensible and findable. The current aalto.fi comparison site seems to provide a confusing division of information, so the aim is to construct a more user-friendly interface. Consistent with this vision, the Aalto IT Customer Manager had a meeting on this subject, and Aalto IT supporters are preparing to list all the services they have to improve.

Ultimately, a contact list is needed to connect the IT supporters with the researchers. A list of contacts exists on aalto.fi, but the problem is that for general issues only. The contact list for the specific issues and precise items is being updated so the researchers can directly and reliably contact them. At the moment, IT supporters are planning to get the list of people, and it will be updated and displayed on the website.

## *ACCESSIBILITY*

Research is about collaborative knowledge creation. Thus, broader access sharing to other organizations abroad and industries should be open. However, a more user-friendly interface is preferred. Not every researcher came from the background of

computing, some are struggling to use commands on the CSC system, and some are not. It is beneficial to have a universal and intuitive function, such as what featured on Google Drive and Dropbox. Even searching files is one of the features that the interviewee also stated because it is difficult to remember and go through all the data that they have stored, compared to the use of a search engine.

## *INTEGRATION*

The amount of research data is increasing in line with the research process. The research data is sometimes stored in one repository and several repositories at times. The researchers want one storage to be integrated into another storage. For example, Aalto Current Research Information System (ACRIS) is desirable to integrate with those third parties when it comes to the dissemination phase, and the researchers have to upload their research to the EU repository or another repository according to their research obligation. Therefore, connected storage system will be more efficient and avoid the researchers transferring the data twice.

## *DATA PRESERVATION*

In the final wrap-up phase, the university should consider how to educate researchers through a research information system and publishing platform on the value of data preservation and findable data both at the university level. Description of data reuse and citation opportunities may help motivate researchers to invest in data research facilities.

## *APPROACHING THE PERSONA*

Among the four personas were identified in this study, the influencers are the most exciting customer as the researchers need to expand the information. However, when they found their solution, the influencers would not need a suggestion or ask IT supporters for help. This somehow made it difficult to identify the person with this role. On the other hand, it is also unfeasible for IT supporters to inform them too much of Aalto policy as it could intervene with their enthusiasm and creativity. Upon identifying the influencers, they can be used as one of the contact information.

## LIMITATION

However, this research is subject to several limitations. One of the major limitations of this research is its scope. Interviewing researchers from different departments means collecting different types of data that they produce during the research. To facilitate research data management, the heterogeneity of this data needs specific features. The best way to organize RDM depends on the user's characteristic, policy issue, or business model involved. For example, in some situations, distinguishing between confidential and open data may be relevant. Researchers who collaborate with a company or are funded by a specific funder and have sensitive data, however, will need to use other storage services than we discussed. Hence, this work can only concentrate on researchers who have used Aalto storage space and CSC, which is by far only easily accessible to Aalto University and another Finnish university as collaborators. Through this study, the author discovers that data should not be referred to as a single object, as this can lead to misunderstandings, over simplifications and less effective policy.

The second limitation concerns the sample of the interviewee. Nevertheless, one or two researchers per department were unable to reflect the RDM needs of their department fully. It is challenging to create the same environment, including how to do something and how to sell the service. The Head of Department also tells the researchers what to do in some situations, while some do not. The data was obtained through semi-structured interviews. Therefore, the accuracy of the results relies heavily on the expertise of the research conductor, such as the capacity for truthful and detailed answers to conduct two-way conversation during the interview. The time constraint also put an account in this study while the interviews produced numerous findings and analysis based on interview notes and transcriptions by affinity diagramming. In addition, more information and research on service design data management research are also required. While this acts as a limiting factor, it can also be seen as one that creates constructive reflections in discussions that would otherwise remain unsaid.



## FUTURE RESEARCH

This study of research data management shows that in order to better understand the differentiating needs of researchers, it requires further research about the specificities of this particular and special group of research. The context of study, including the funders, type of data, could be considered more profoundly when conducting future research. In addition, the variations of each type of research data and outcomes should be taken into account when thinking about the best way to organize and how the data repository can help the researchers. The future research might be better if conducted specifically to certain departments to limit the various kind of research data.

The stakeholders should involve in the process of designing the research data management services. In this study case, the discussion of the improvement ideas defined with Aalto IT personnel only. It would, therefore, be much more fruitful if the CSC would also join the discussion as one of the service providers in this venture. In order to be able to consider all the different stakeholders involved in delivering successful research data management. Hence, the advancement of ideas of improvement will be assessed under the joint decisions.



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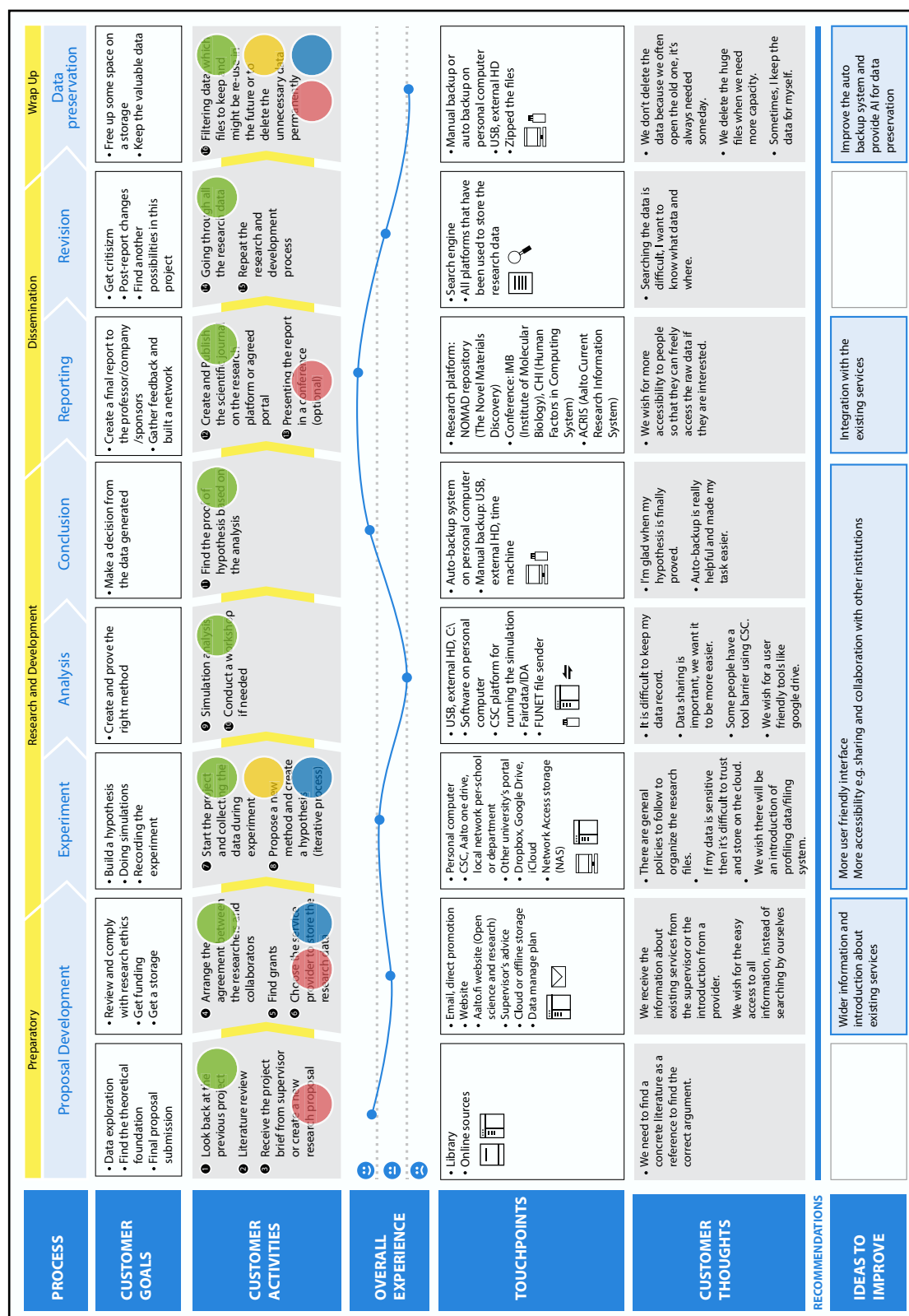
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## THE CUSTOMER JOURNEY MAP



## The Supporters

## The Decision Makers






## The Influencers

## The Doers



# THE EMPATHY MAP

## *The Supporters*

 <b>Think &amp; Feels</b> <ul style="list-style-type: none"><li>• How to respond to customer quickly</li><li>• I want to solve all of the problems that occurred</li><li>• Oh no! The performance is getting slower</li></ul>	 <b>Hear's</b> <ul style="list-style-type: none"><li>• My file is missing!</li><li>• I cannot access my account</li><li>• Tell me 'how to' use ...</li></ul>
 <b>Say &amp; Do's</b> <ul style="list-style-type: none"><li>• Have you tried to turn it on/off again?</li><li>• I will find a solution!</li><li>• Let me check what happened here</li></ul>	 <b>See's</b> <ul style="list-style-type: none"><li>• Computer screen</li><li>• Email asking for a help</li><li>• The service performance</li></ul>
<b>Pain point</b> <ul style="list-style-type: none"><li>• Clients' complaining</li><li>• Keep the platform performance</li><li>• Need time to reply to the emails</li></ul> <b>Goals</b> <ul style="list-style-type: none"><li>• Provide clear information</li><li>• Secure the data</li><li>• Maintain performance</li><li>• Solved customer problems</li></ul>	 <b>How to support this user to achieve their goals</b> <ul style="list-style-type: none"><li>• Identify the supporter and build a network</li><li>• Identify the supporter's coverage to reach as many researchers as needed</li><li>• Provide information to supporters</li><li>• Give supporters access rights/admin rights to solve the problems</li></ul>



## The Decision Makers

### ★ *Think & Feels*

- Oh, my drive capacity is almost full
- Make account for the students in his team
- I should use this provider; it is more simple and easy

### 👂 *Hear's*

- Can we use other storage?
- Please share the files
- A local network is really helpful

### 📢 *Say & Do*

- Let us use it to store our research data
- Keep the file arrangement nice
- I know this provider because someone came and explained to me

### 👁️ *See's*

- Researchers within the team
- Project proposal/brief
- Thesis paper

### *Pain point*

- Cannot find the files' directory
- My storage is almost full
- Limited sharing access

### *Goals*

- Choose the right provider
- Keep the confidentiality
- Sharing within the group research



### *How to support this user to achieve their goals*

- Maintain the decision-make account, so they are always satisfied when using the service and will encourage their team member to use it as well
- Make sure they know the strategic goals of Aalto for data management (Data Policy)



## The Influencers

### ★ *Think & Feels*

- We have to try the new feature on another provider
- I found another interesting service
- Current storage is not enough

### 👂 *Hear's*

- Do you have any suggestions?
- Where do you put the file of ... ?
- There is a new service provider worth to try

### 📢 *Say & Do*

- I found a useful reference for a research data provider
- The files organizing here is a mess

### 👁 *See's*

- Research data
- Raw and simulation data
- Browser
- Manual/guideline

### *Pain point*

- Organize the research data
- The cloud/computer is working slow
- Find the collaboration tools to share files with other co-workers

### *Goals*

- Suggest the new provider
- Suggest the improvement
- Manage the research data



### *How to support this user to achieve their goals*

- Recognize the influencers and educate them, they look potential to join a tech-watch community
- Keep them update to all information needed and provide them with the legal changes e.g., GDPR



## The Doers

### ★ *Think & Feels*

- I heard the movement of managing data
- I wish all of this service is more user-friendly
- I want to share my files with other colleagues from different universities

### 👂 *Hear's*

- This is a mess!
- Where did I store my folder?
- My computer/cloud work so slow
- I don't know how to use this tool

### 📢 *Say & Do*

- I wish everyone could organize their data neatly
- I want to know who owns my data on a cloud
- I hope to put my confidential data securely

### 👁️ *See's*

- Simulation
- Tons of files
- Various type of data

### *Pain point*

- Organize the research data
- The cloud/computer is working slow
- Find the collaboration tools to share files with other co-workers

### *Goals*

- Suggest the new provider
- Suggest the improvement
- Manage the research data



### *How to support this user to achieve their goals*

- Create an entry-level where the doers can get all of the information and regulations needed
- Facilitate the doers to keep the confidential data
- Wider the sharing access to collaborate with other colleagues from different universities



## INTERVIEW QUESTION LISTS FOR THE RESEARCHERS

The semi-structured interview had more open questions following the conversation with the researchers. Here are the examples of fixed questions:

- How was your journey during the research?
- What kind of data you have?
- What is the status of your data, is it open, confidential, sensitive, or?
- Who is the second owner of your data?
- When did you realize that you need a storage?
- How did you decide a storage capacity?
- What other services are you using, and why?
- How difficult did you feel when you first created the account?
- How did you find the available service? Why did you choose that?
- How is the financial condition of your data storage?
- What happen after you publish your work?

## INTERVIEW QUESTION LISTS FOR THE SERVICE PERSONNEL

- What is your responsibility?
- How is the current situation of your service?
- What is your strategy by far?
- Which consumer/technology/service model that affect your service? Do you have any benchmark?
- What is your short term and long term goals?
- How did your customers find the most value in your service?
- What is the success measurement in your services and how do you want it in the future?
- What is the brand identity that you want to show in this services?
- How did you promote your service?

## LISTS OF INTERVIEWEE

<b>Researchers</b>	<b>Responsibility</b>	<b>Department</b>
Imam Santoso	PhD candidate	Chemical and Metallurgical Engineering
Patrik Rinke	Associate Professor	Applied Physics Computational Electronic Structure Theory
Petri Käpylä	Research fellow	Computer Science
Kari Laasonen	Leader Professor	Chemistry and Materials Science
Gülay Emreçan	Doctoral candidate	Design
Ilja Makkonen Kristoffer Simula	Academy research fellow Doctoral candidate	Applied Physics, Antimatter and Nuclear Engineering
Adam Foster	Professor	Applied Physics, Surfaces and Interfaces at the Nanoscale, Quantum Engineering
Zenith Purisha	Postdoctoral candidate	Department of Electrical Engineering and Automation
Konstantin Simovski	Professor	Electronics and Nanoengineering
Mikko Möttönen	Professor, Leader of group research	Applied Physics Quantum Engineering
Kyttä Marketta Kamyar Hasanzadeh	Professor PhD candidate	Built Environment
Mika Jalava	Postdoctoral candidate	Built Environment
Anna Cichonska	Project employee	Computer Science
Udayanto Dwiatmojo	Postdoctoral candidate	Electrical Engineering and Automation
Ferdi	PhD candidate	Electronics and Nanoengineering
Tito Adibaskoro	PhD candidate	Civil Engineering

*Other interviewees wished to be anonymized*

# CONSENT SHEETS

Aalto University

[February 19<sup>th</sup>, 2019]

## Information for Research Participants in Research Data Management Services

You have been invited to participate in a research study. [by downloading this application you participate in a research study] [by answering this survey you participate in a research study]. Participation in this study is voluntary. You can discontinue your participation in the study at any time. Should you discontinue your participation, you will not be subject to any negative consequences, but information gathered from you up until the point of cessation of your participation may be used in the study.

1. **This research is a collaborative project between Aalto University and CSC that work together to develop their research data management services as a whole. Our goal is to build seamless path and process that best supports the researchers and we are using the service design methods to focus on the researcher's point of view.**
2. **The data is collected by recording interviews from the Aalto researchers, and approximately 20 researchers are needed for research study participation. We only use the recording interviews for study purposes and it will not be published.**
3. The personal data that I will process are; a name, the department of study. Additional data needed are some sorts of the researcher's project in details (project title, type of data is collected, data storage).
4. **The purpose of this study is:**  
To understand the researcher's point of view, so that we could gather the insight and find the touch points for the improvement in the research data management services development.

### The concrete method by with personal data is collected and analyzed

The personal data will only be used for the personal study and internal presentation and it would be anonymized if the interviewee wished so.

### Effects to data subjects

The processing of personal data is necessary and proportionate for academic expression and as a proof of balance information that has been collected from various department of study in Aalto University.

### Lawful basis for processing of special categories of personal data:

- ☐ Processing is necessary for reasons of substantial academic research
- ☐ Data subject has given explicit consent to the processing of those personal data for one or more specified purposes, by [for example; internal meeting].

### 5. Measures taken to protect your data

The following measures are taken in this research study to protect your rights:

- ☐ The research study has a research plan
- ☐ The person responsible for the research study is: Rahel Manurung
- ☐ Personal data is only processed and transferred for the purposes of mentioned at section 4, and information is handled in a manner so as not to reveal information about a specific person to external parties.
- ☐ A data protection impact assessment has been conducted regarding this research study.



## 6. Storage period of your data and anonymisation

The storage period is during the research data management services project is finished.

Anonymised data is no longer personal data.

## 7. The rights of the study participant in a scientific study

The data subject has following rights:

Right to obtain information on the processing of personal data, unless an exception has been provided for by law

Right of access

Right to rectification

Right to erasure (right to be forgotten). Not applied when legal basis of processing is a task in the public interest

Right to restriction of processing

Right to object to the processing

Right to data portability when legal basis of processing is consent

Right to withdraw consent to processing of personal data

Right not to be subject to a decision based solely on automated processing

Because data is being processed for the purposes of scientific research, the purpose of processing is not to use the data in decision-making related to the participant.

To exercise his or her rights, the data subject should contact the Data Protection Officer, or the research study contact person.

If the purposes for which a controller processes personal data do not or do no longer require the identification of a data subject by the controller, the controller shall not be obliged to maintain, acquire or process additional information in order to identify the data or the data subject for the sole purpose of complying with the GDPR. If the controller cannot identify the data related to a data subject, the rights of access, rectification, erasure, and data portability shall not apply, except if the data subject provides additional information enabling his or her identification and the identification of the research datum that relates to data subject.

A derogation in the rights of data subject is necessary and justified, if the research is conducted for the purpose of public interest, and the rights of the research participant would likely prevent reaching these goals or hinder them greatly, and these derogations are necessary to ensure these objectives.

☐ There is no deviation from the rights of the data subjects in this research study

This research is likely to derogate from the following rights specified in the EU General Data Protection Regulation (justifications and protection measures for the derogation are located below):

- ☐ The data subject's right to access data concerning them.
- ☐ The data subject's right to rectify any data concerning them.
- ☐ The data subject's right to restrict the processing of personal data.
- ☐ The data subject's right to object to the processing of personal data.

The following protection measures have been enacted in this research so that the derogation in the rights of the research participants can be made:

- ☐ The processing of personal data is based on a research plan.
- ☐ The research has a responsible principle investigator.
- ☐ The personal data is used and disclosed only for the purposes of scientific research or some other compatible purpose and all parties involved in the research agree to ensure that no data pertaining to any specific individuals is disclosed to any third parties.

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- ☐ The research involves the processing of special categories of research data. An impact assessment on this processing has been made and submitted to the Office of the Data Protection Ombudsman before the processing is set to begin.

It may be necessary to deviate from the rights of the data subject, as defined in GDPR and national legislation, if the research study is a task carried out in the public interest and the exercising of the participant's rights would likely prevent reaching the aim of the research study, the following rights can be deviated from:

- The right to access data
- The right to rectify information
- The right to restrict processing
- The right to be forgotten
- The right to object to processing

If, however, it is possible to achieve the aims of the study and the achievement of the purpose is not greatly hindered, Aalto University will actualize your rights as defined in the GDPR. The extent of your rights is related to the legal basis of processing of your personal data, national legislation and exercising your rights requires proof of identity.

#### **8. More information on the study and the exercising of your rights**

The controller in this study is Aalto University.

The contact person in matters related to the research study:

Rahel Manurung

rahel.manurung@aalto.fi

+358 45 1140124

The research participant must contact Aalto University's data protection officer if they have questions or demands related to the processing of personal data.

Data Protection Officer Jari Söderström

Phone number: 0947001

Email: tietosuojavastaava@aalto.fi

If the research participant sees that their data has been processed in violation of the general data protection regulation, the participant has the right to lodge a complaint with the supervisory authority, the data protection ombudsman (see more: tietosuoja.fi).

## Research participant of Research Data Management Services

I have understood that participation is voluntary and at any point in the research study, I am at liberty to notify that I no longer wish to participate in the study, but all the information gathered up until that point is can be used as described in the Privacy Notice.

I understand that my name may be published in the thesis paper and in the research data *(only selected if a basis for presenting the data with identifying information exists, such as in the case of an architect or artist being interviewed about their work; this line is removed if information is being anonymised or pseudonymised)*

I have received sufficient information about the research study, I have had the possibility to have my questions answered, I have understood the information and I wish to participate in the research study.

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Signature and name of research participant (choosing to participate can be also expressed electronically)

Contact details:  
Rahel Manurung  
+358451140124  
rahel.manurung@aalto.fi  
Aalto-University

